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(12) **United States Patent**
Bowerman

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(54) **CLASP**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(22) Filed: **Dec. 14, 2015**

(65) **Prior Publication Data**

US 2016/0095406 A1 Apr. 7, 2016

Related U.S. Application Data

(63) Continuation-in-part of application No. 14/355,887, filed as application No. PCT/US2012/063244 on Nov. 2, 2012, now Pat. No. 9,717,308.

(60) Provisional application No. 61/628,740, filed on Nov. 4, 2011.

(51) **Int. Cl.**

A44B 11/04	(2006.01)
A45C 13/00	(2006.01)
A45F 3/00	(2006.01)
A45F 5/00	(2006.01)
A45C 7/00	(2006.01)
A44B 17/00	(2006.01)

(52) **U.S. Cl.**

CPC ***A44B 11/04*** (2013.01); ***A45C 13/001*** (2013.01); ***A45F 3/00*** (2013.01); *A44B 17/0041* (2013.01); *A45C 7/0086* (2013.01); *A45F 5/00* (2013.01); *A45F 2003/001* (2013.01)

(58) **Field of Classification Search**

CPC A44B 11/04; A45C 13/001; A45C 7/0086; A45F 2003/001; A45F 3/00; A45F 5/00

See application file for complete search history.

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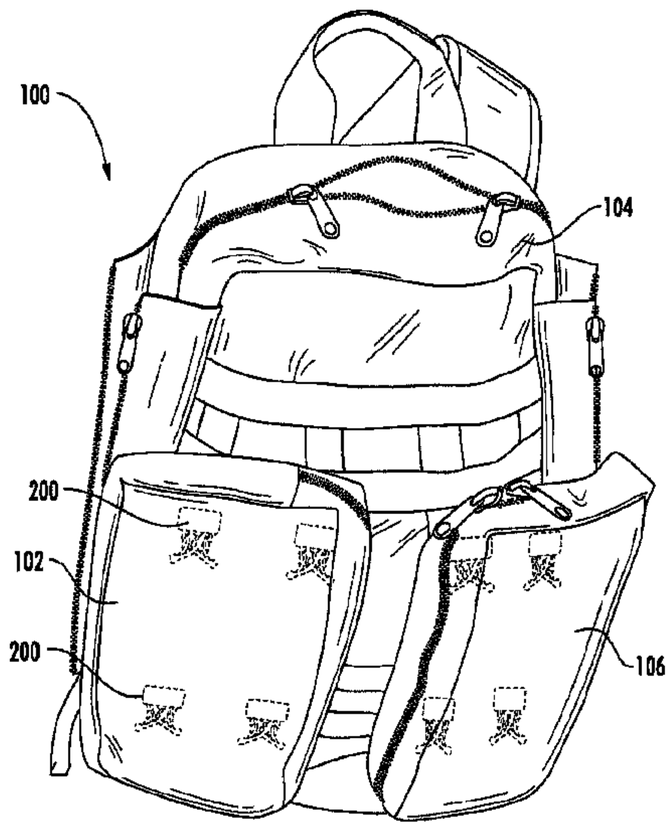
(57) **ABSTRACT**

A clasp for attaching a component to a bag having a strap. The clasp includes a protrusion portion having a protrusion and a receiving portion having a first arm and a second arm. The first and second arms define a receiving cavity configured to receive the protrusion of the protrusion portion. In one embodiment, the receiving portion further includes a body to which the first arm and second arm are connected by a plurality of flexible connectors. In another embodiment, the first arm is connected to the second arm by a clip. The arms of the receiving portion may each comprise a flexible extension which resists opening of the cavity. Alternatively or in addition, the receiving portion may further have a spring assembly which resists opening of the cavity. The receiving portion may further include one or more C-shaped strap retainers for attaching to the strap of the bag.

20 Claims, 25 Drawing Sheets



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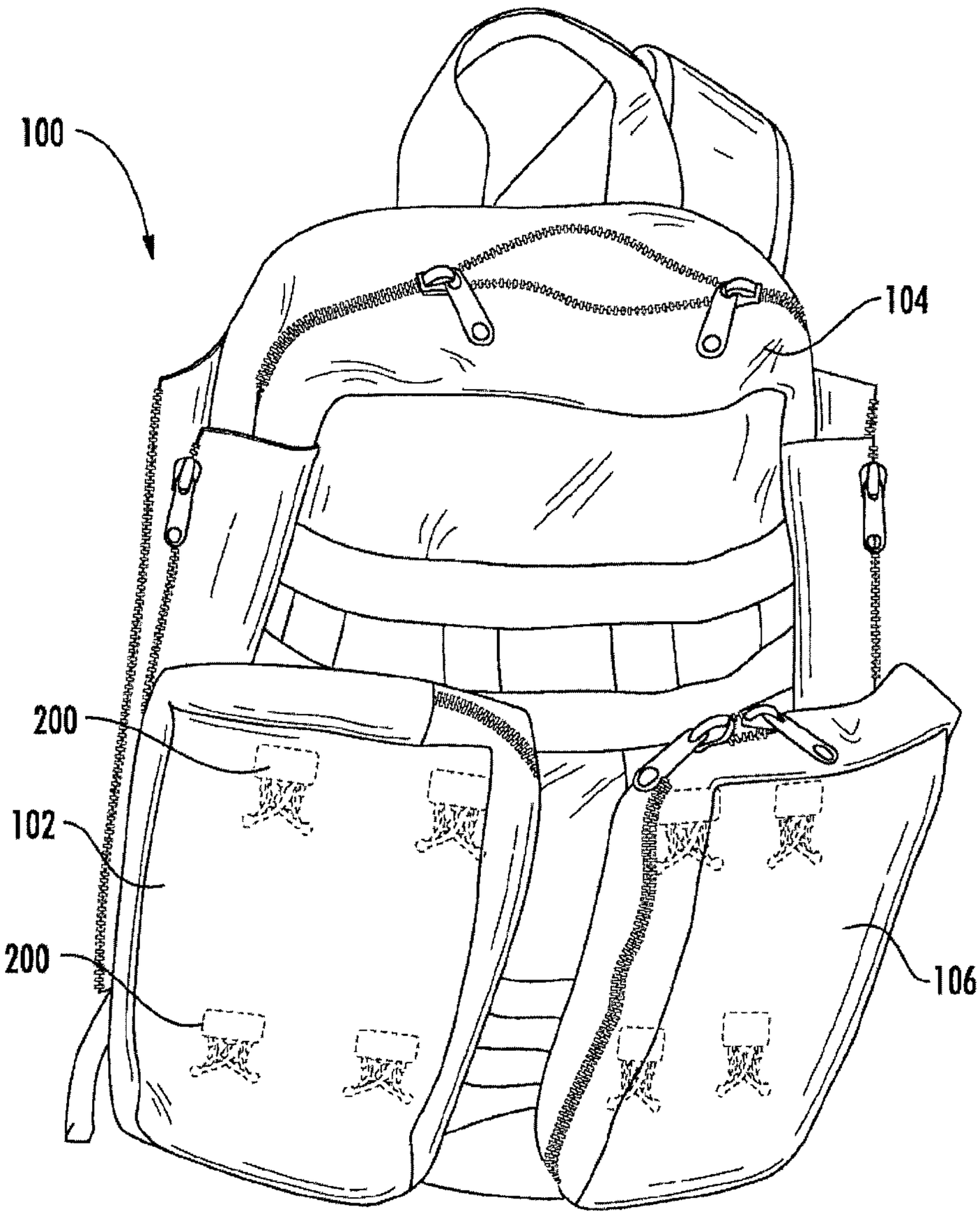


FIG. 1

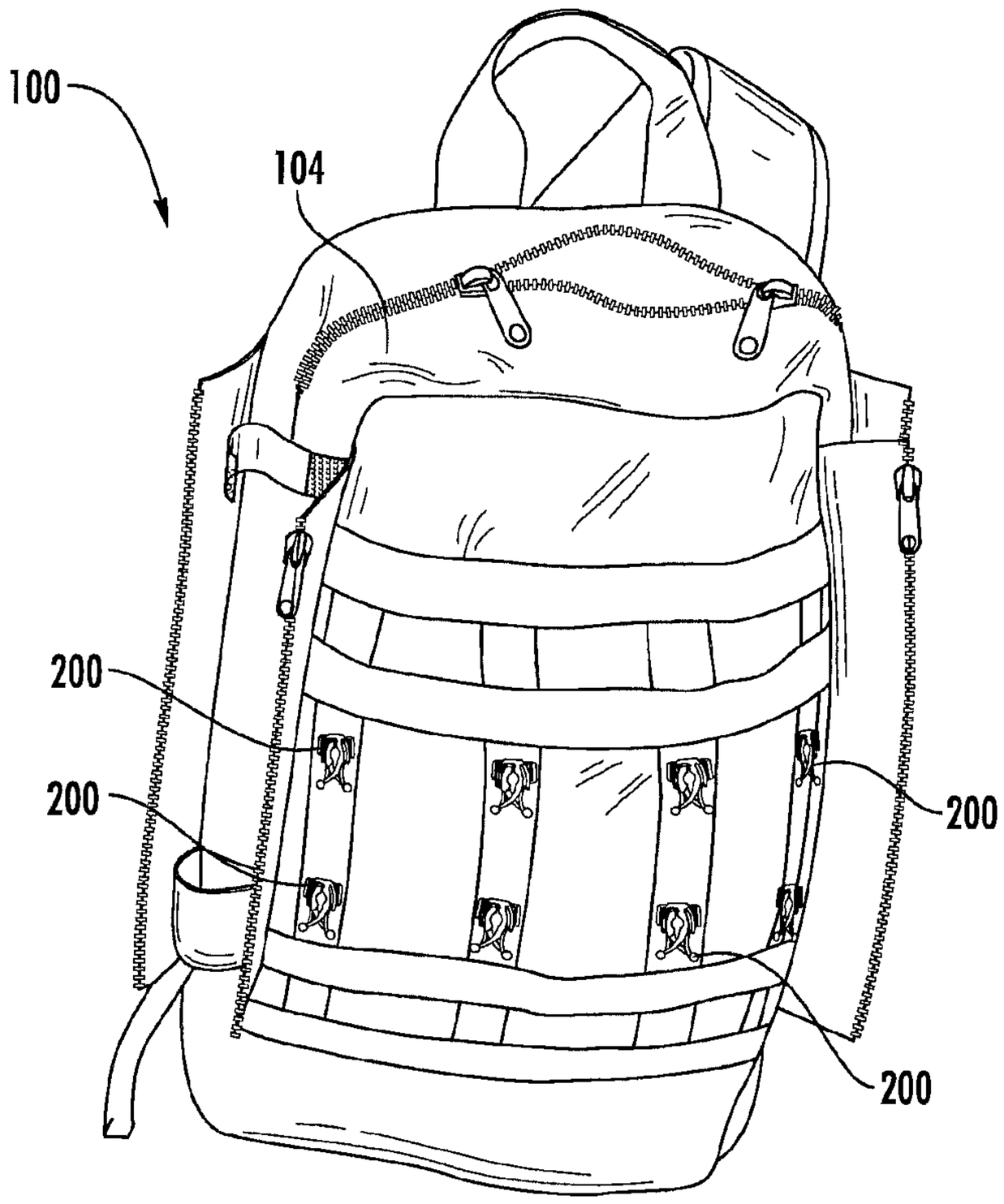


FIG. 2

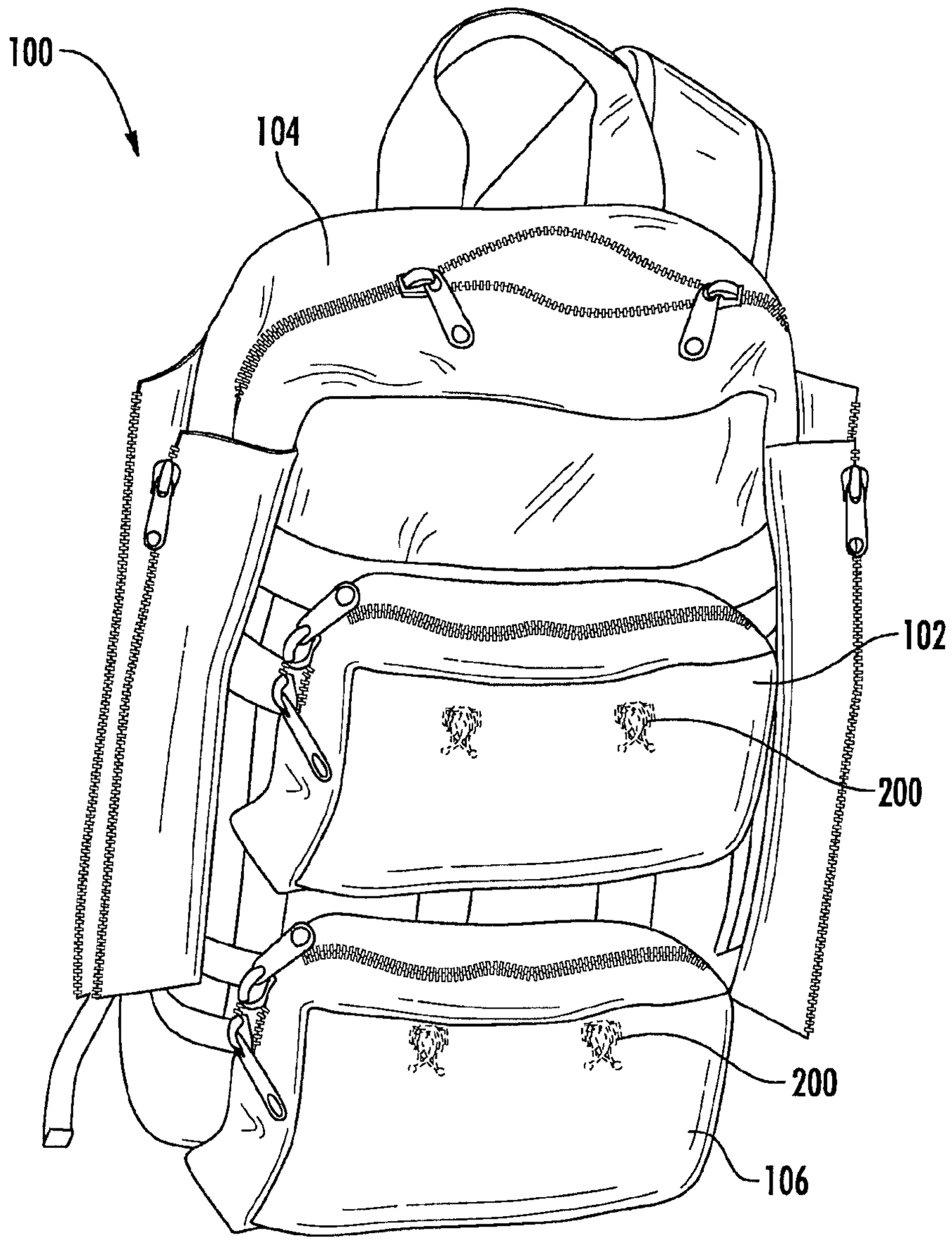
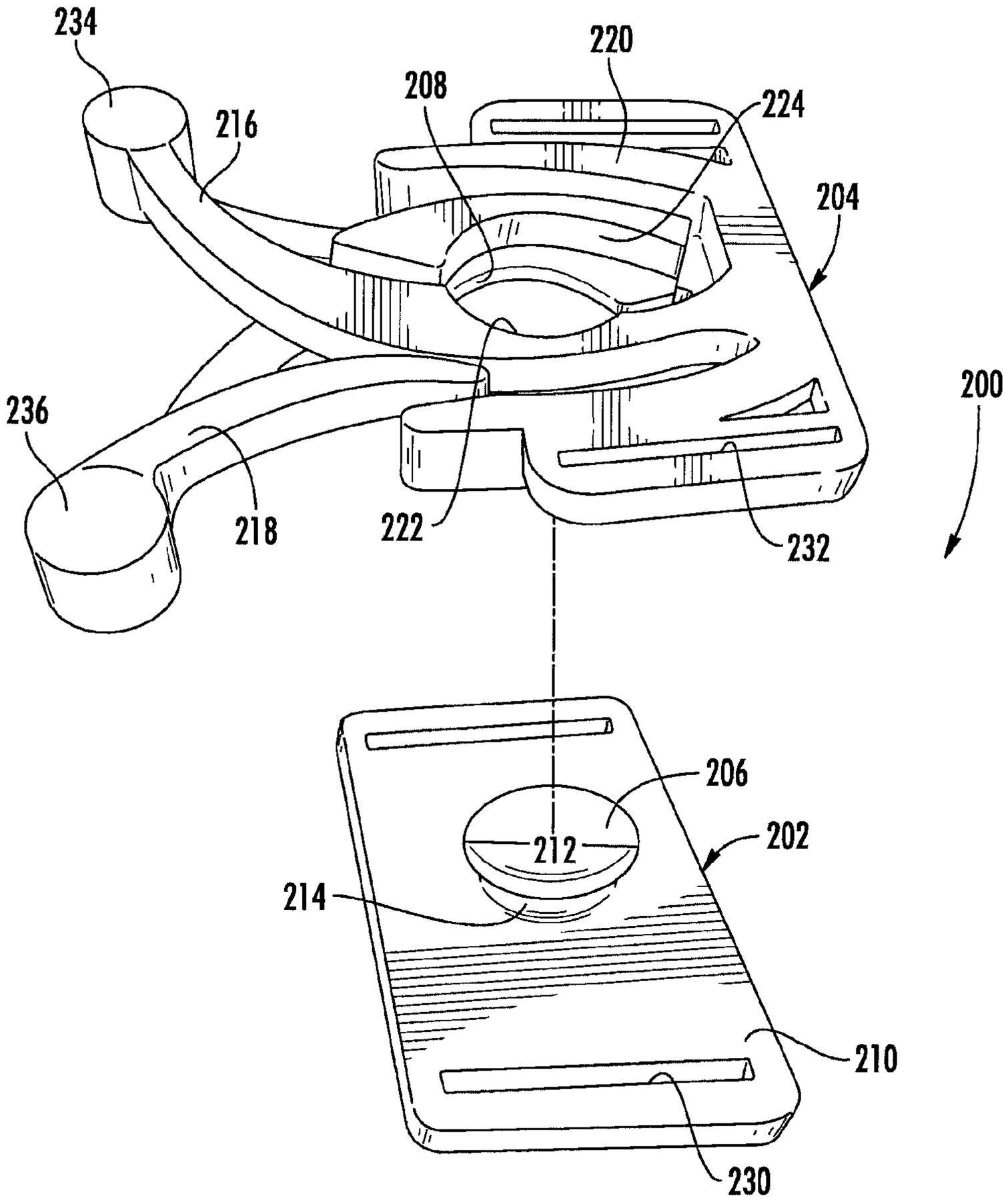


FIG. 3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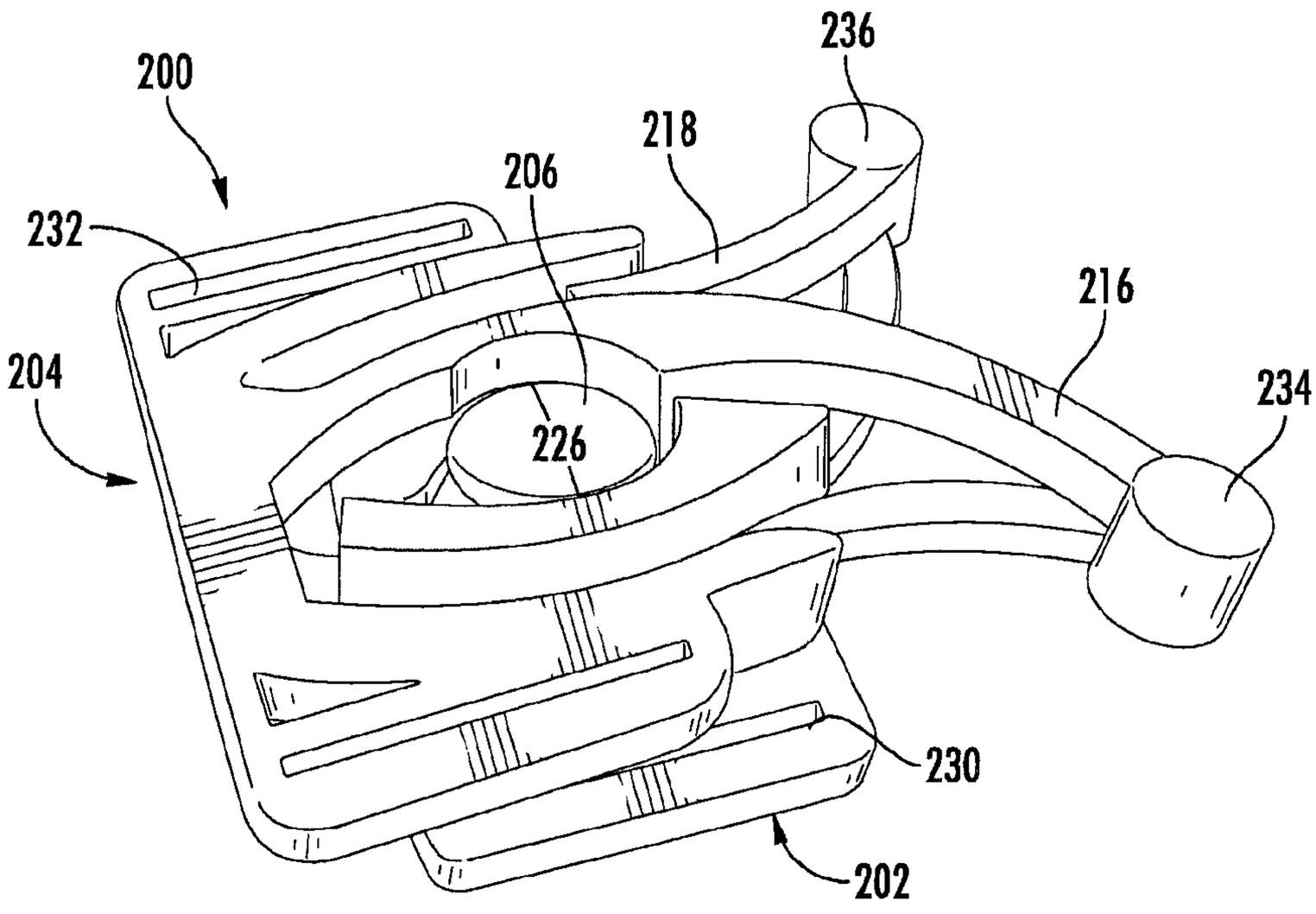

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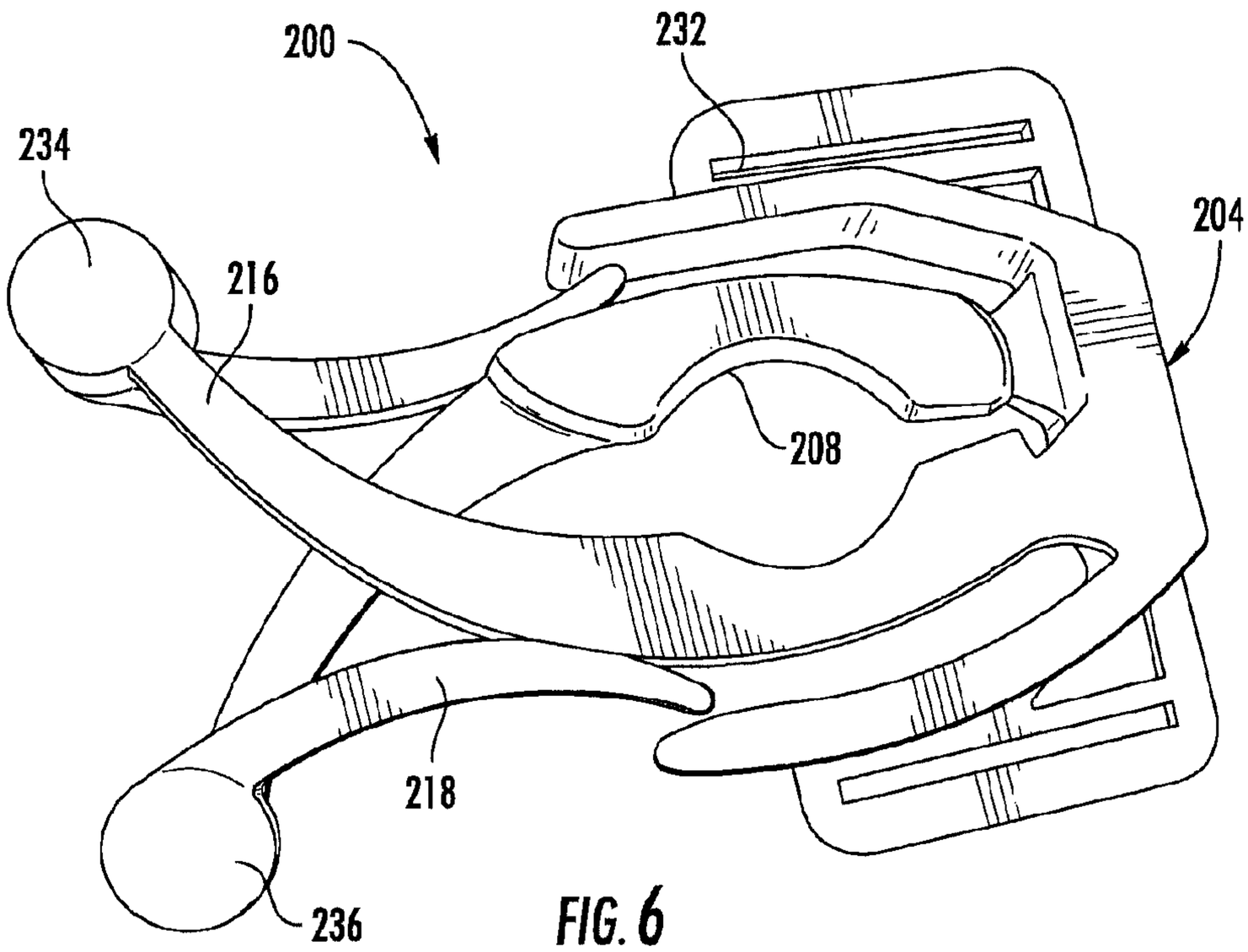

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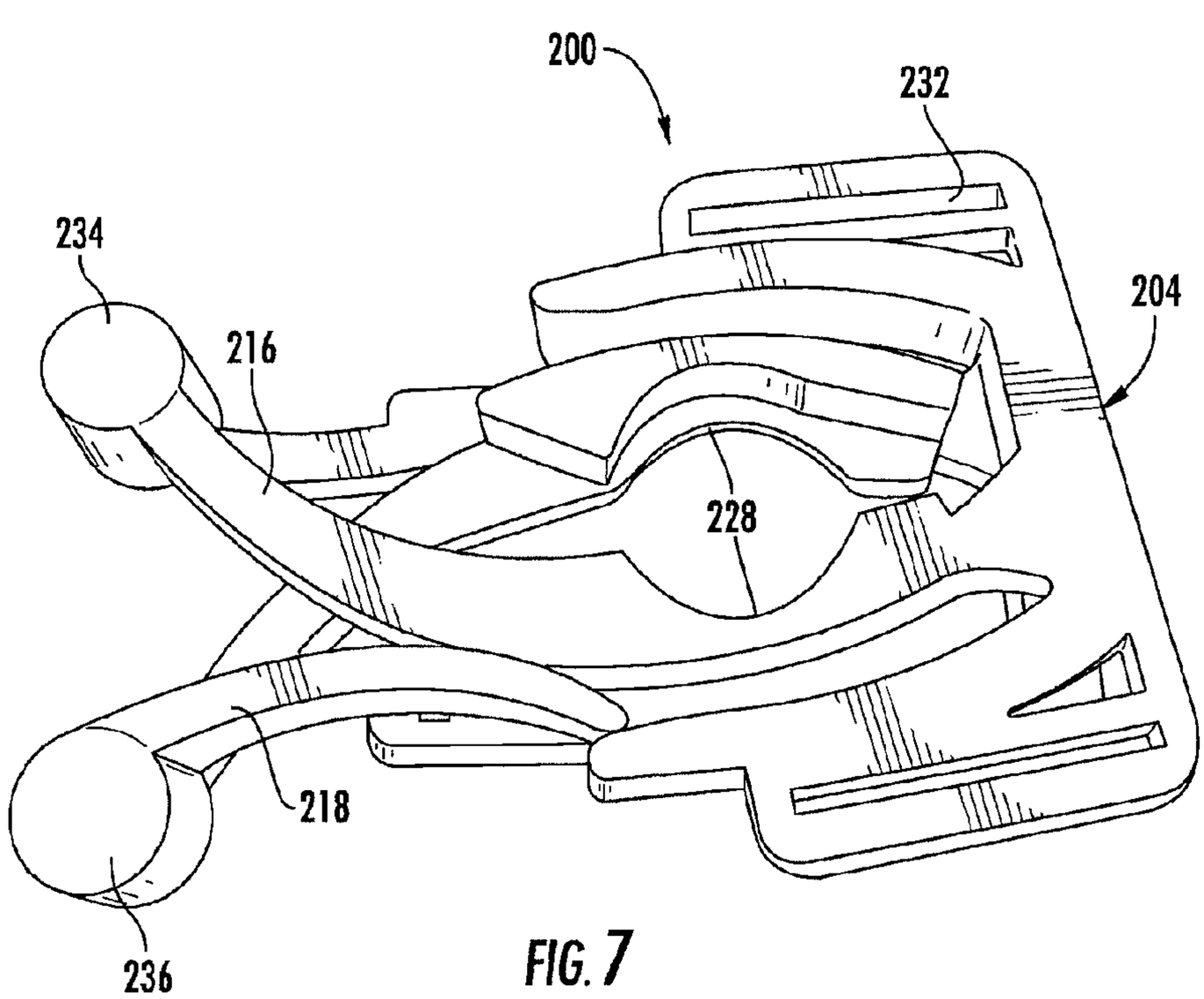

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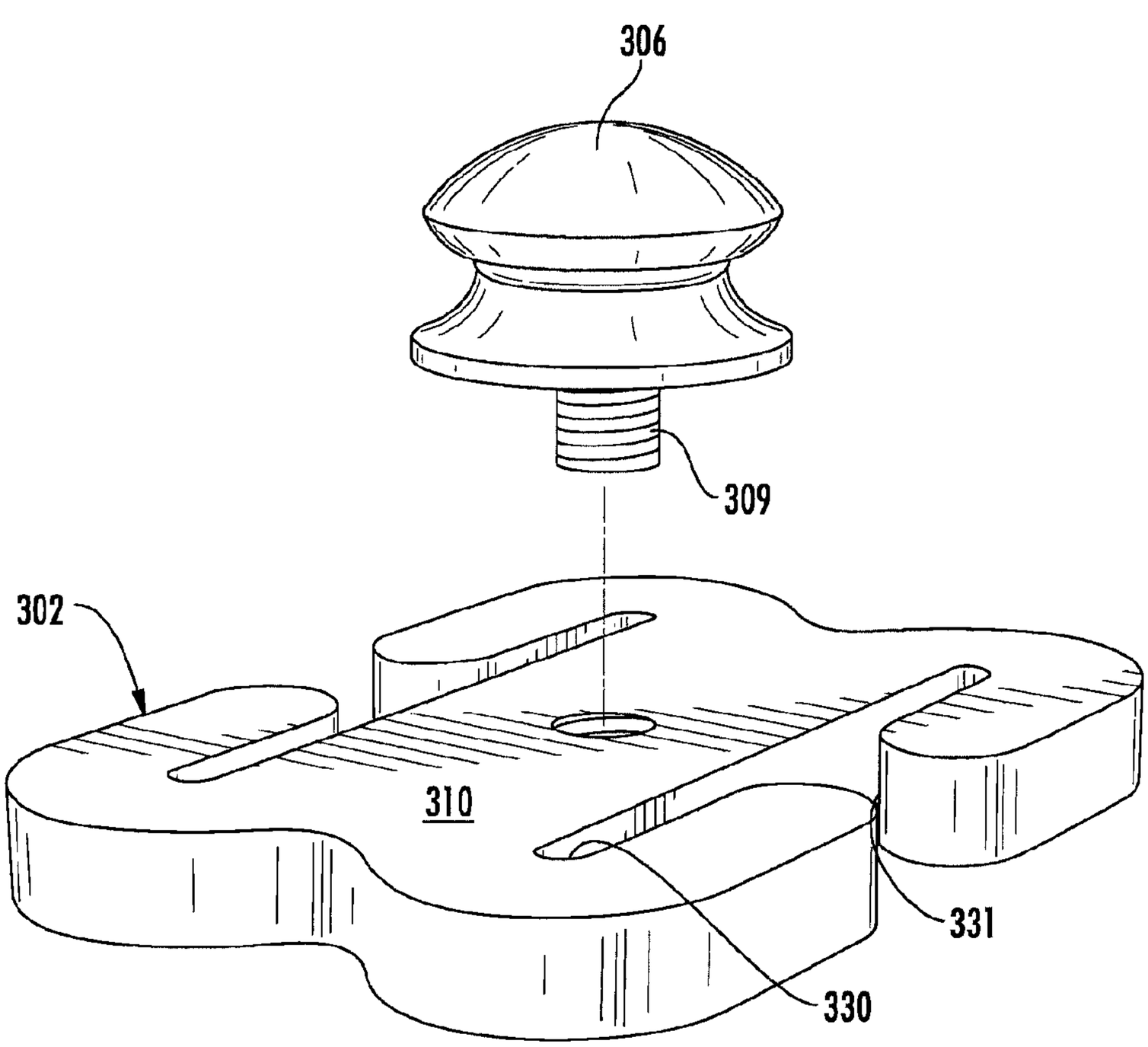

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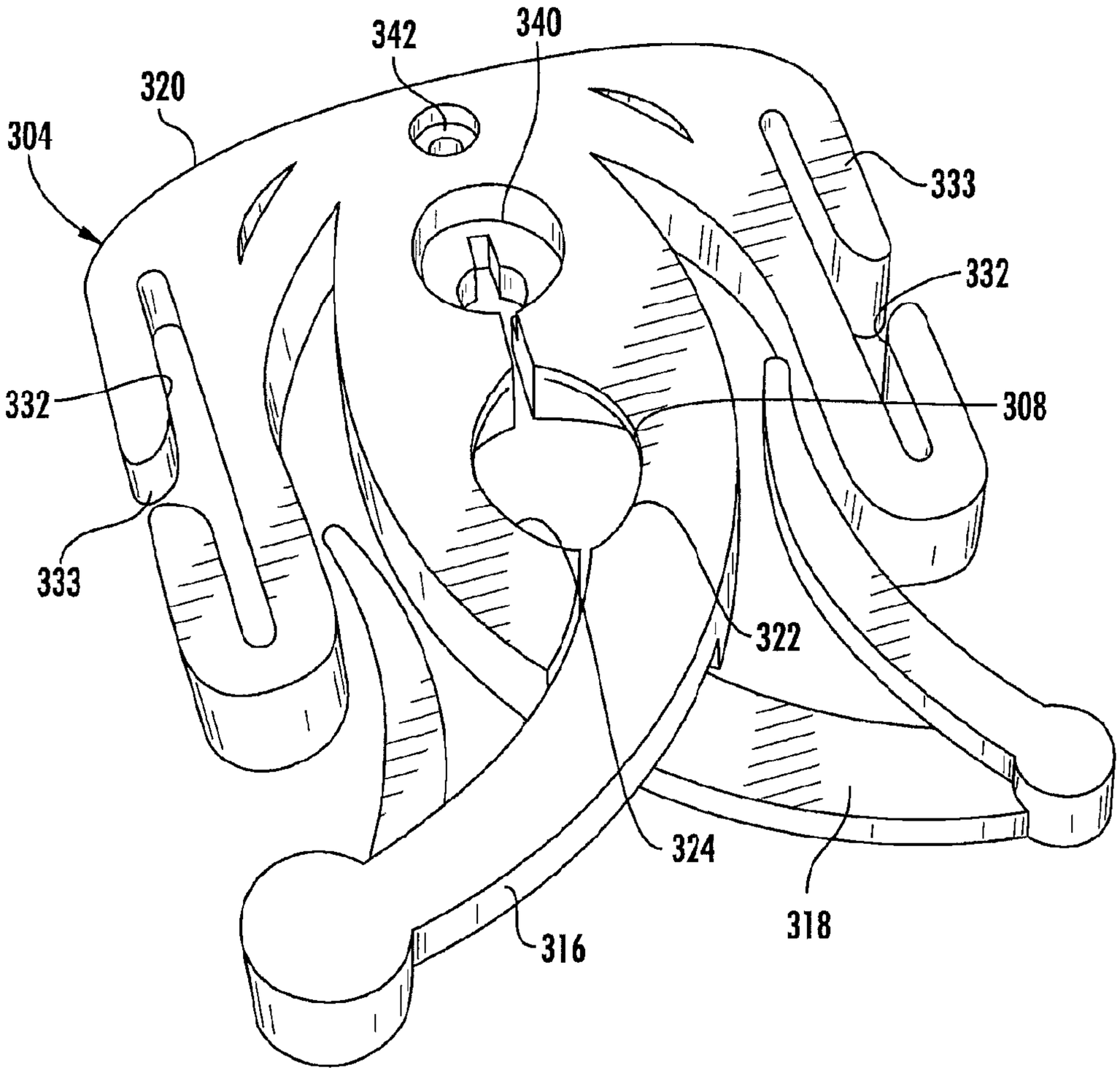

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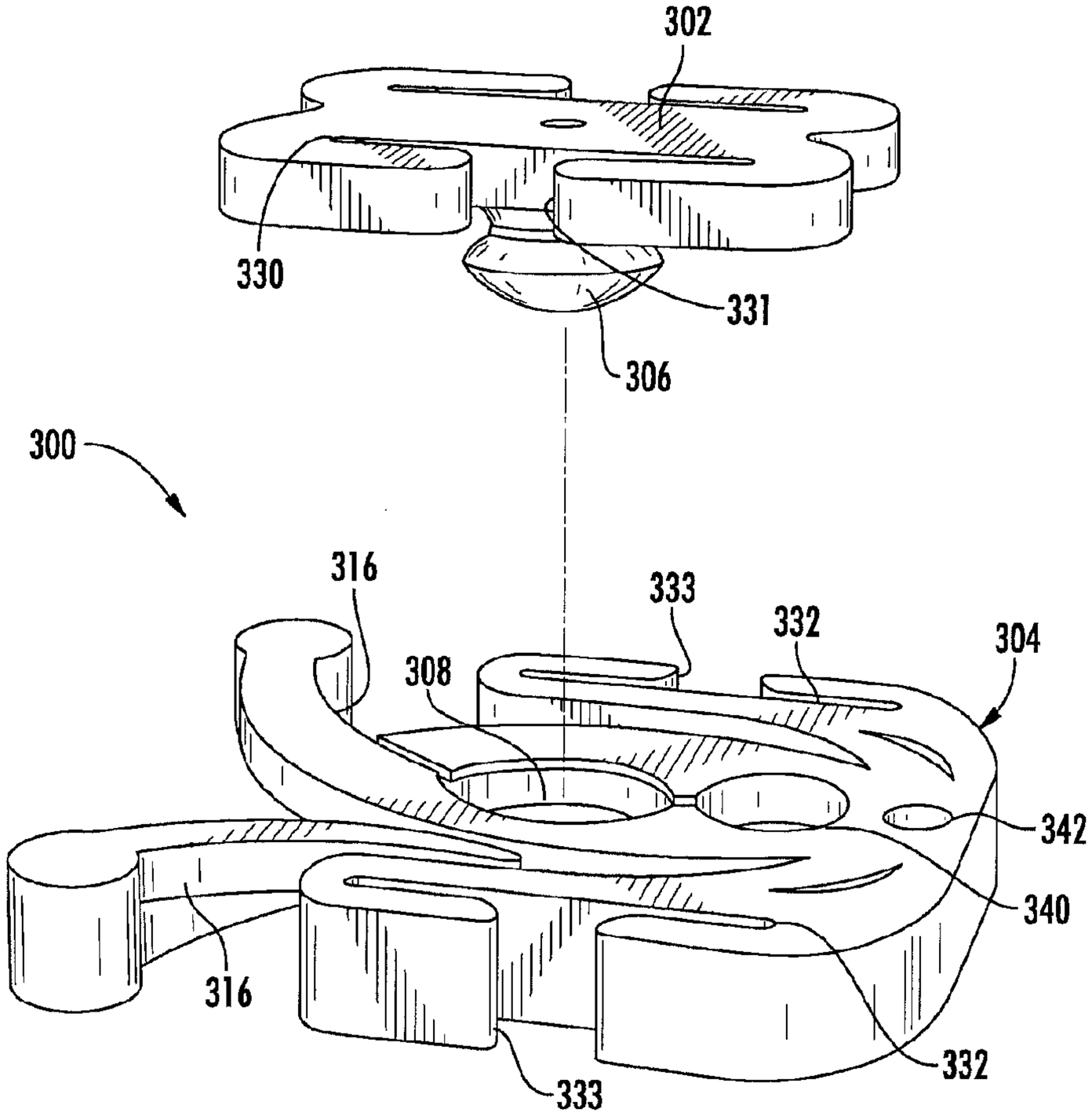

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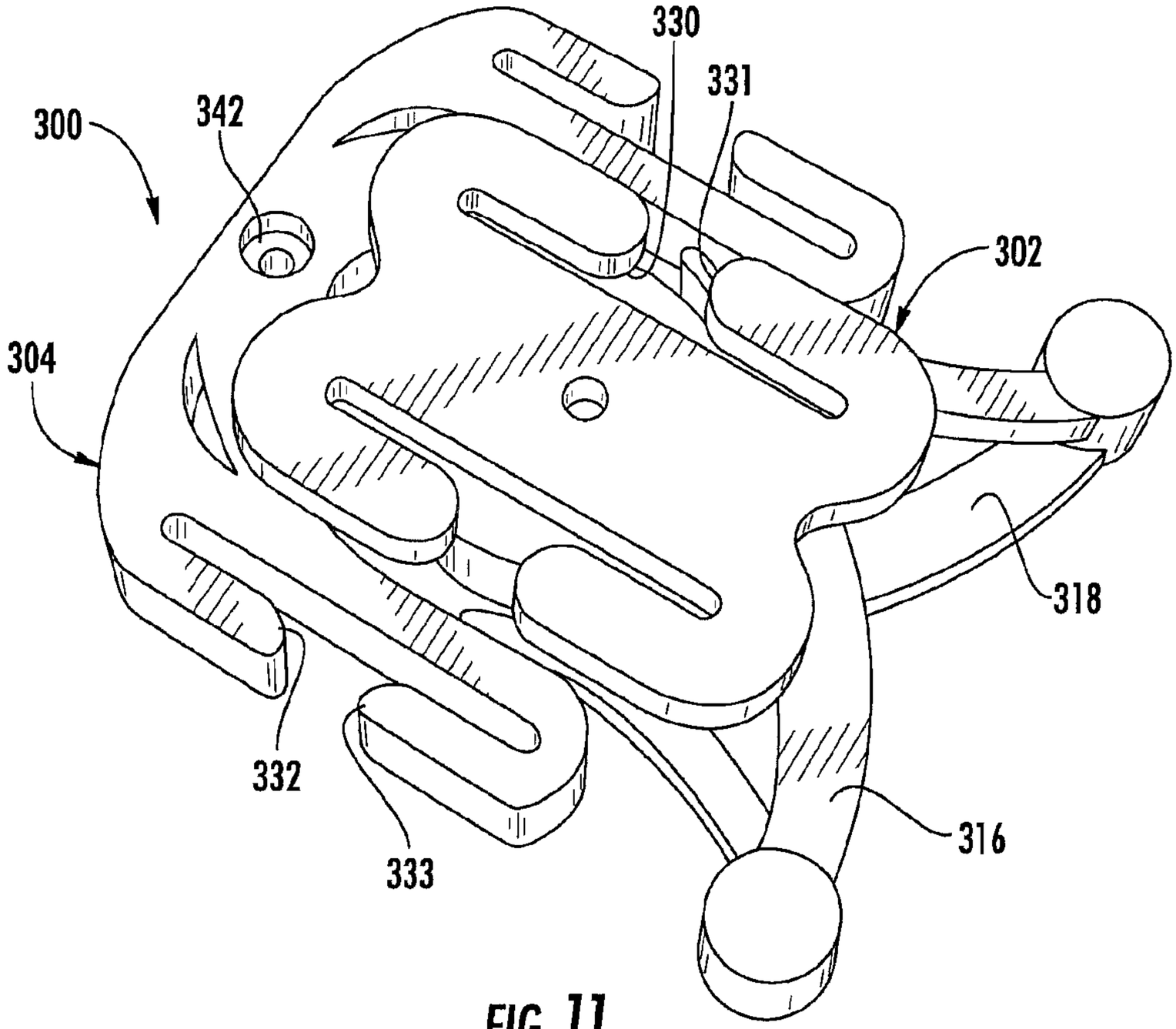

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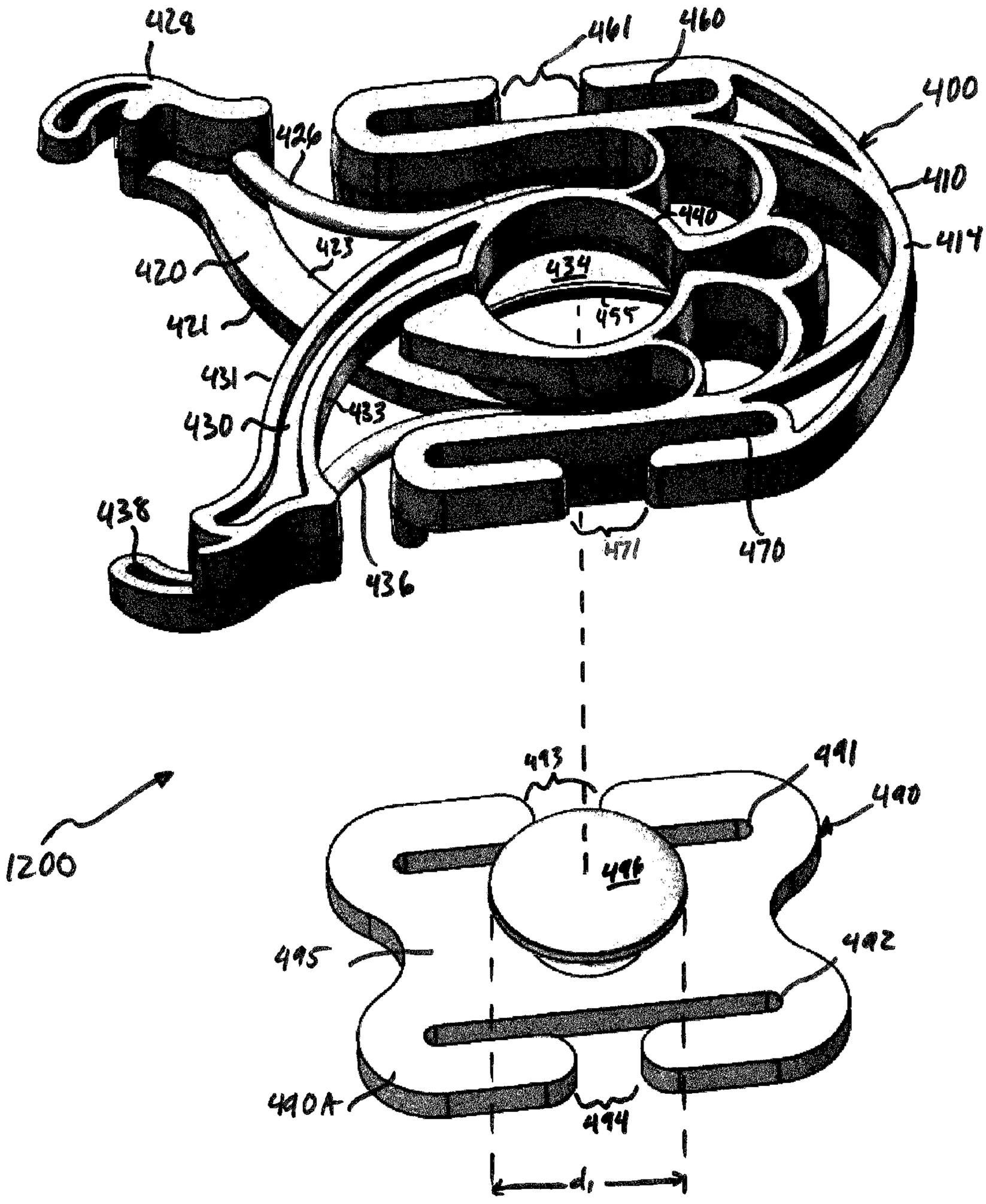
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FIG. 12

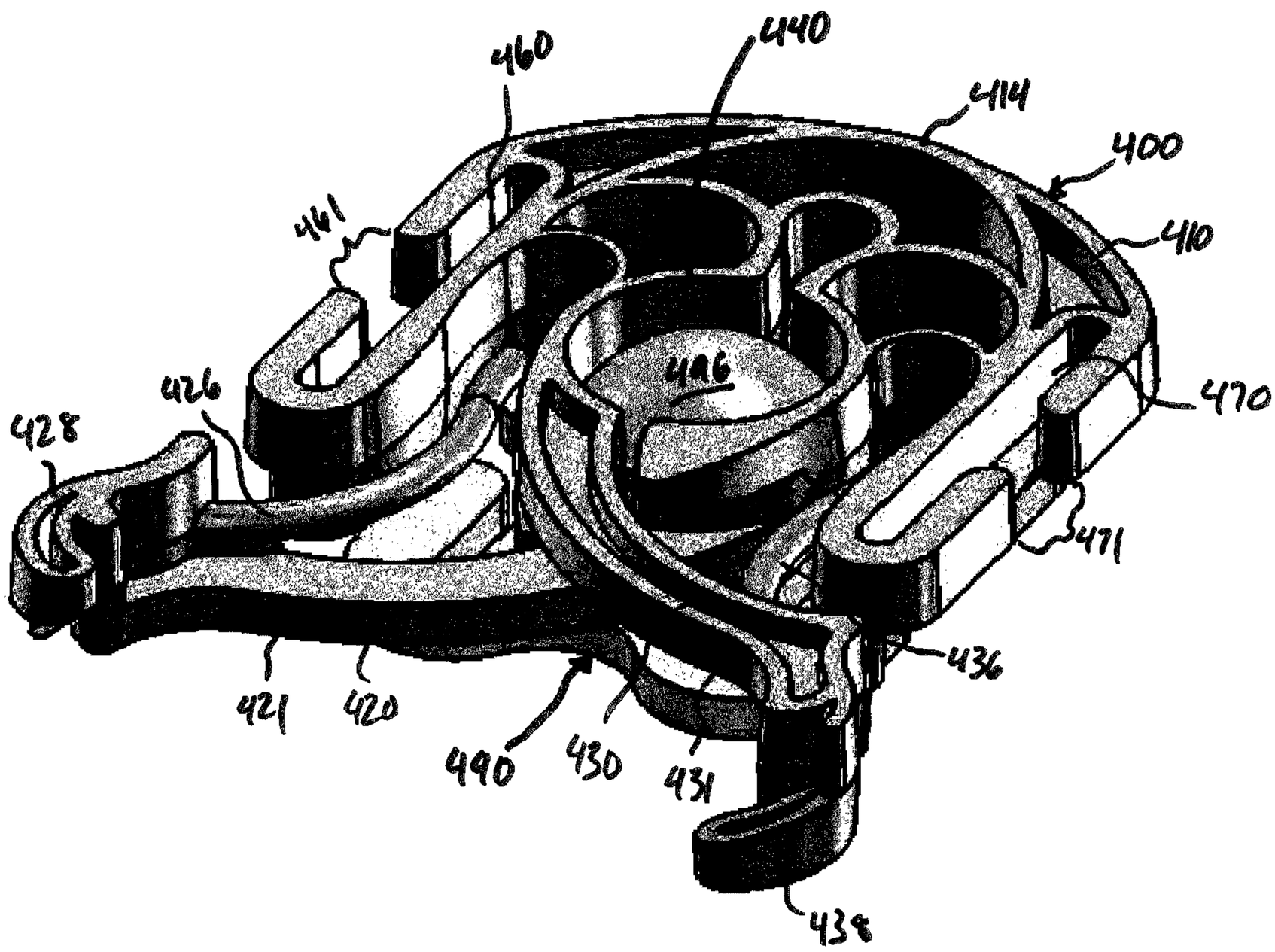
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FIG. 13

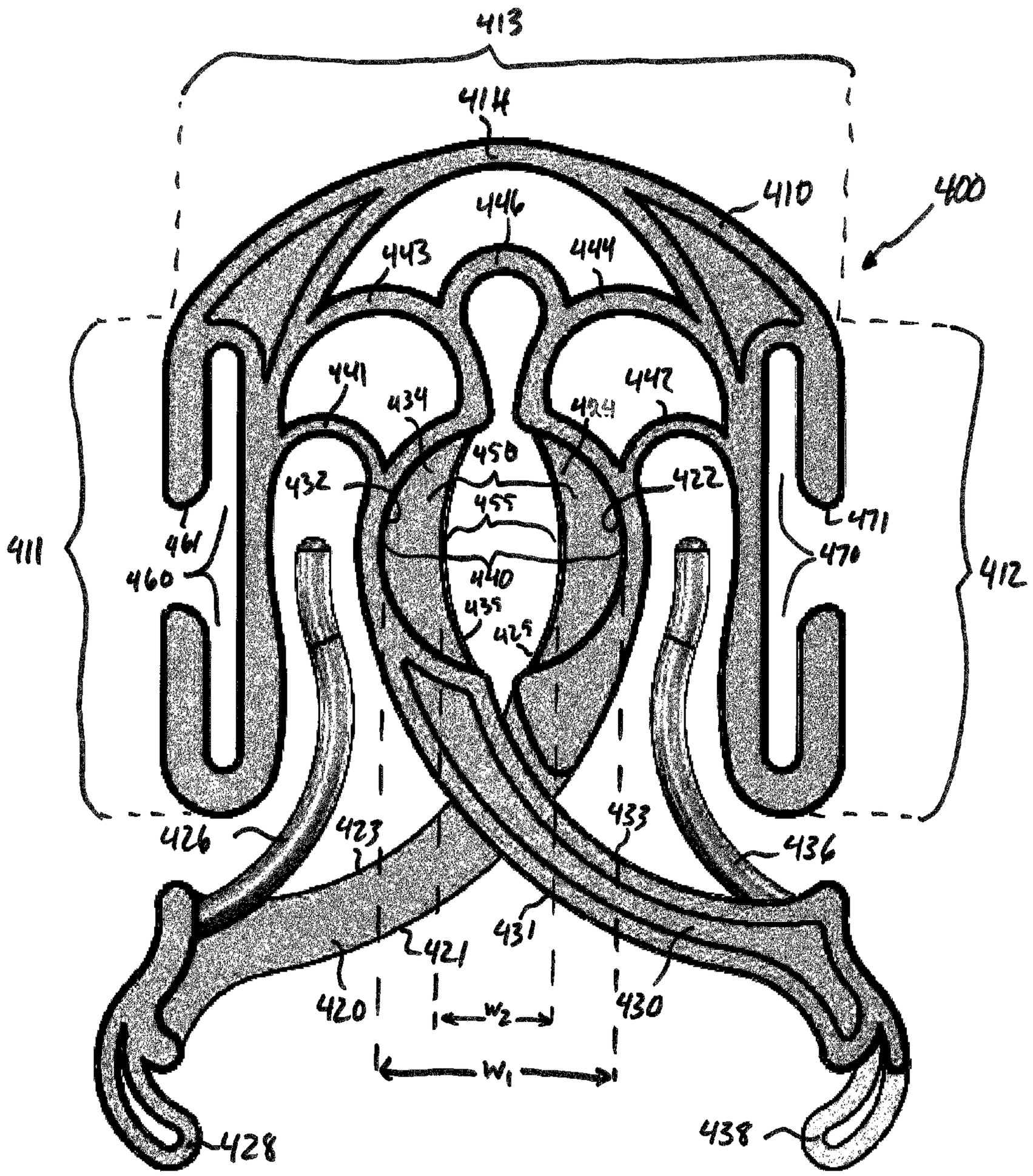
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FIG. 14

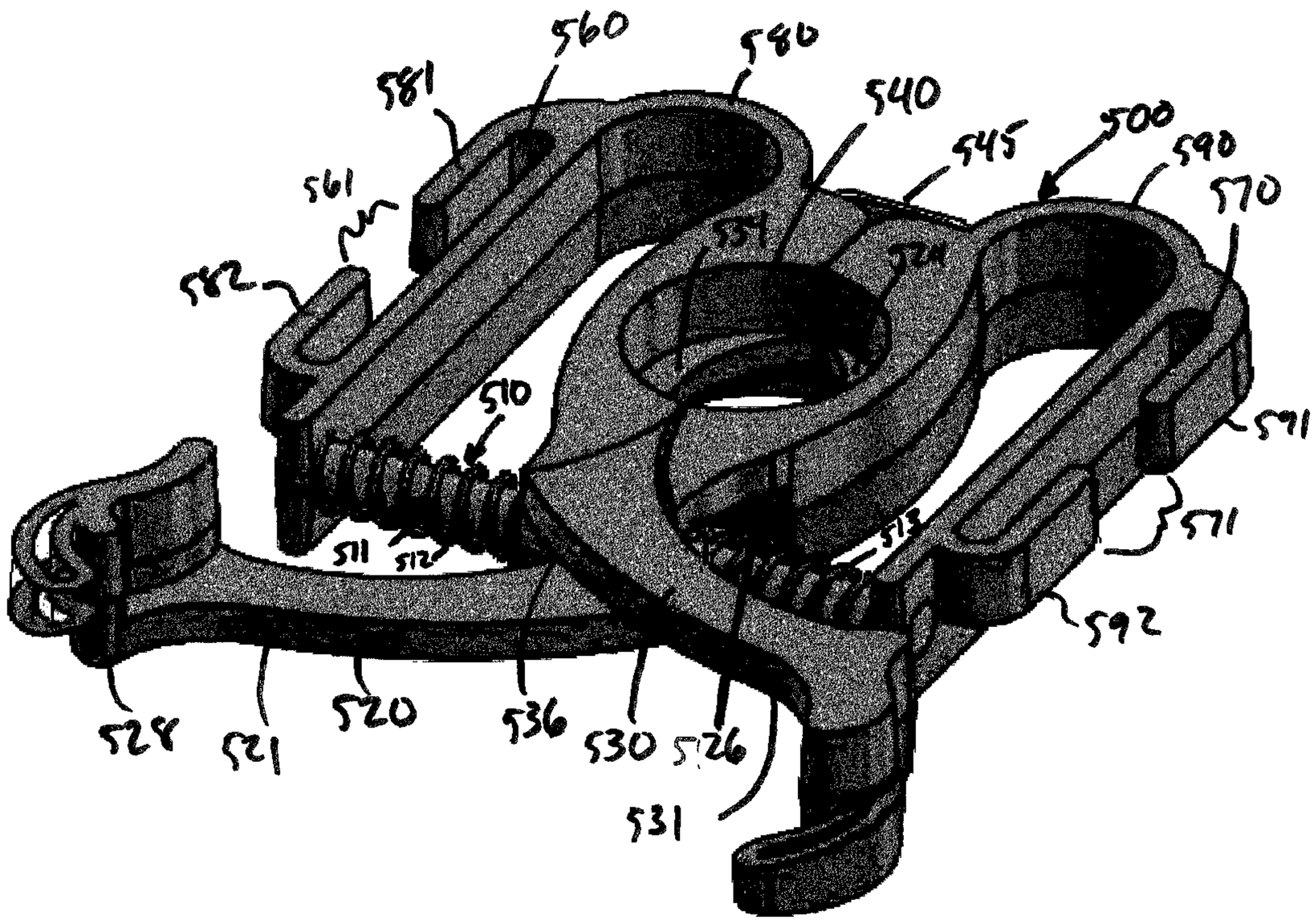
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FIG. 15

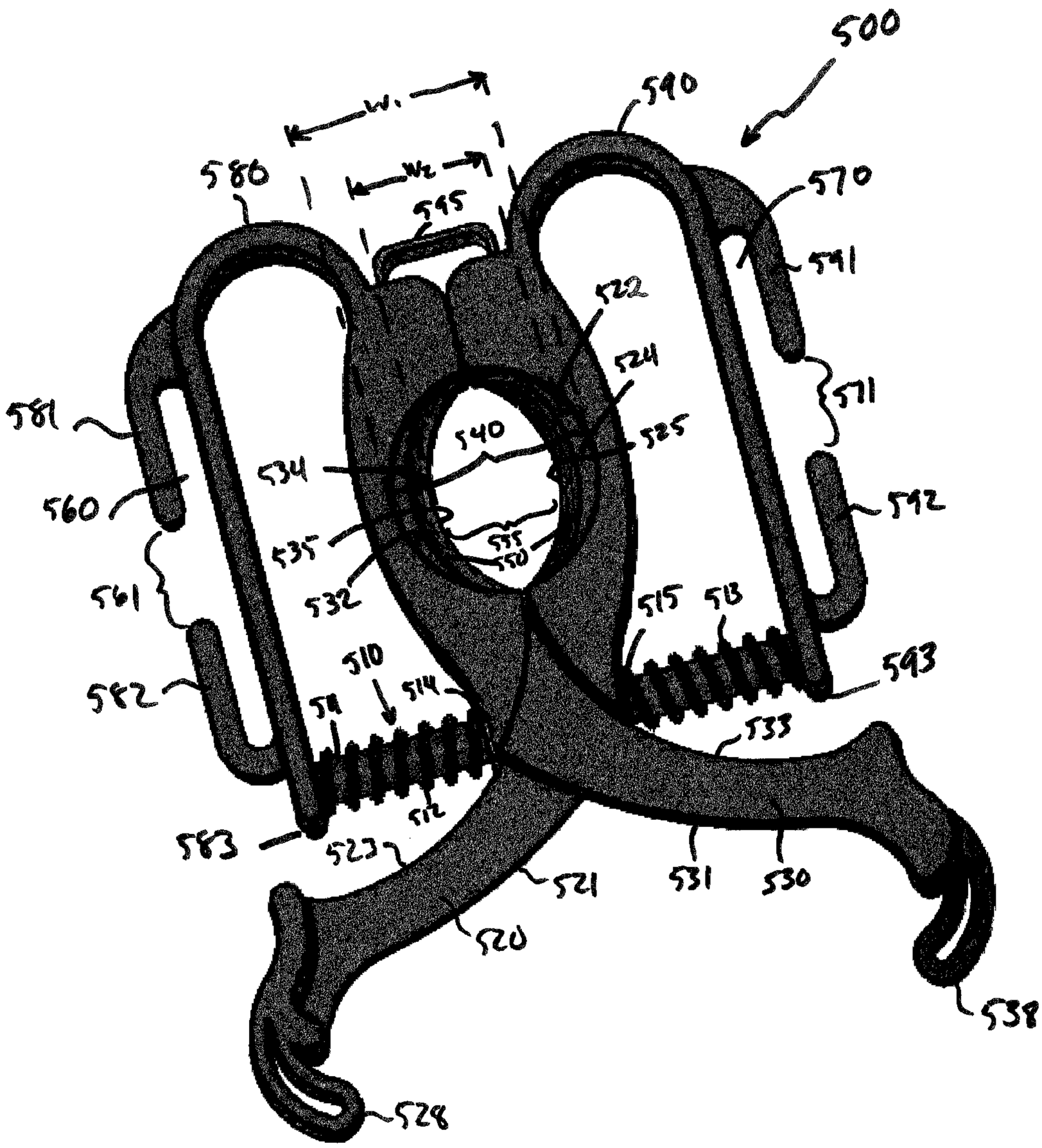
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FIG. 16

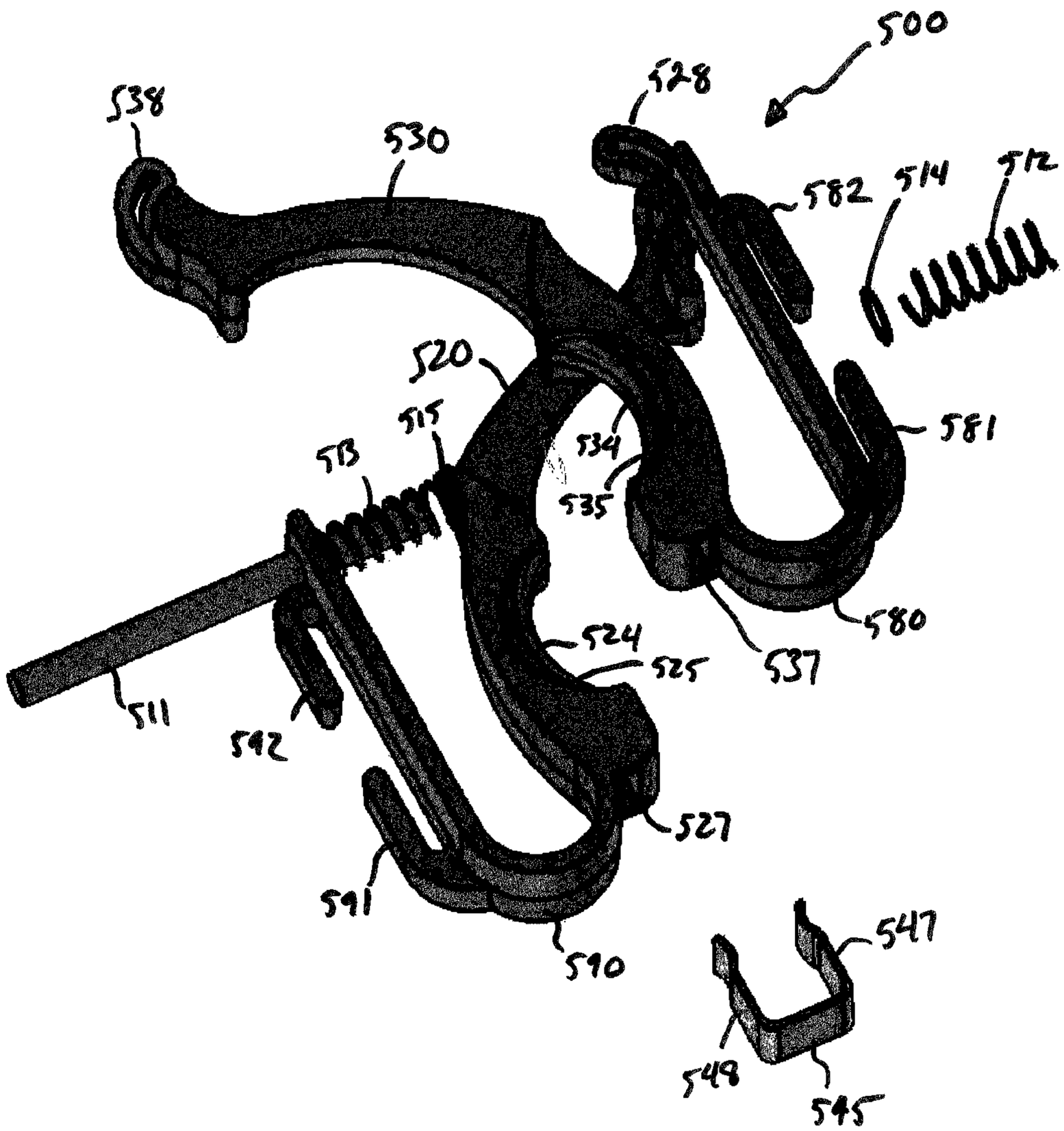
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FIG. 17

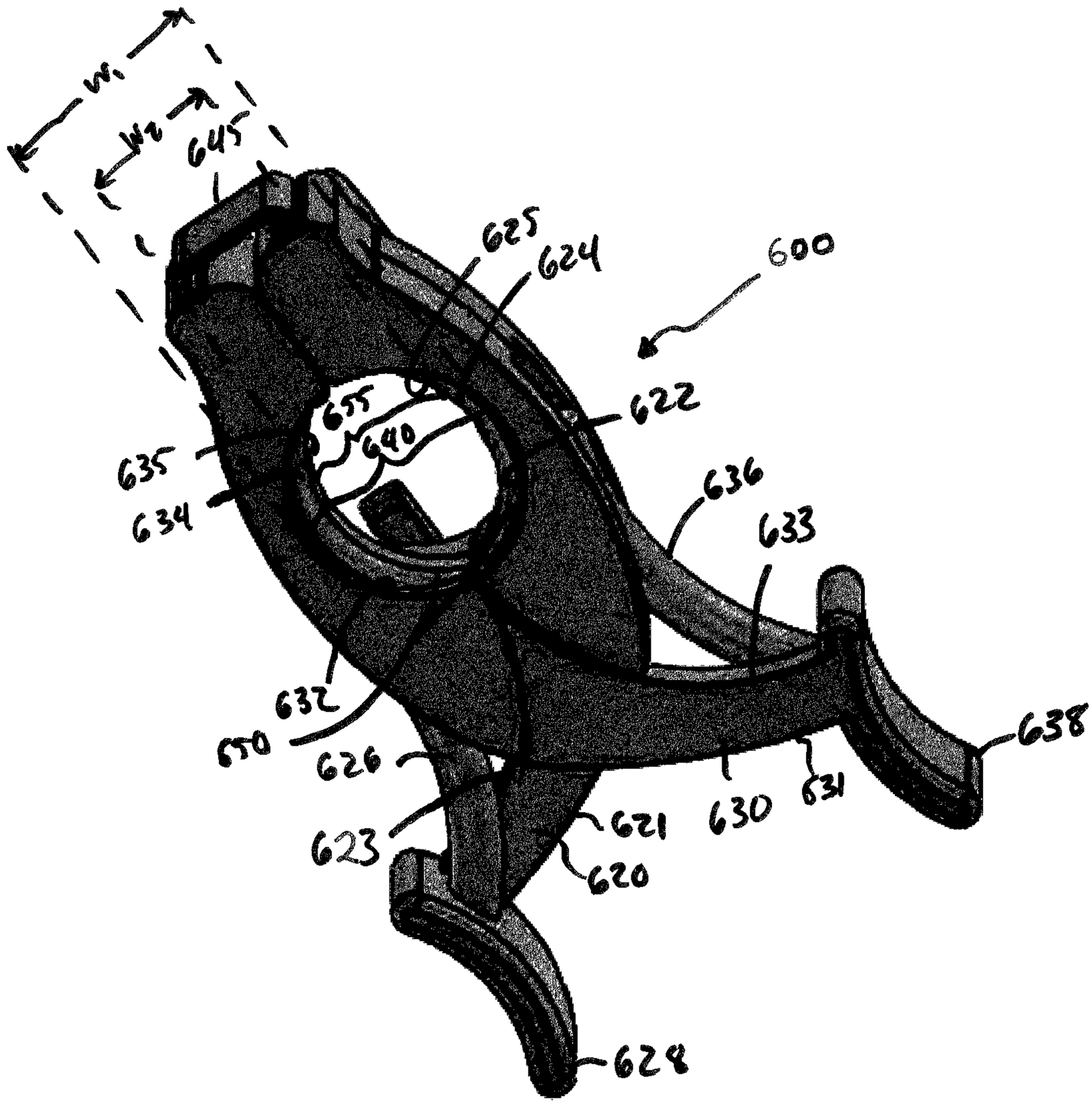
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FIG. 18

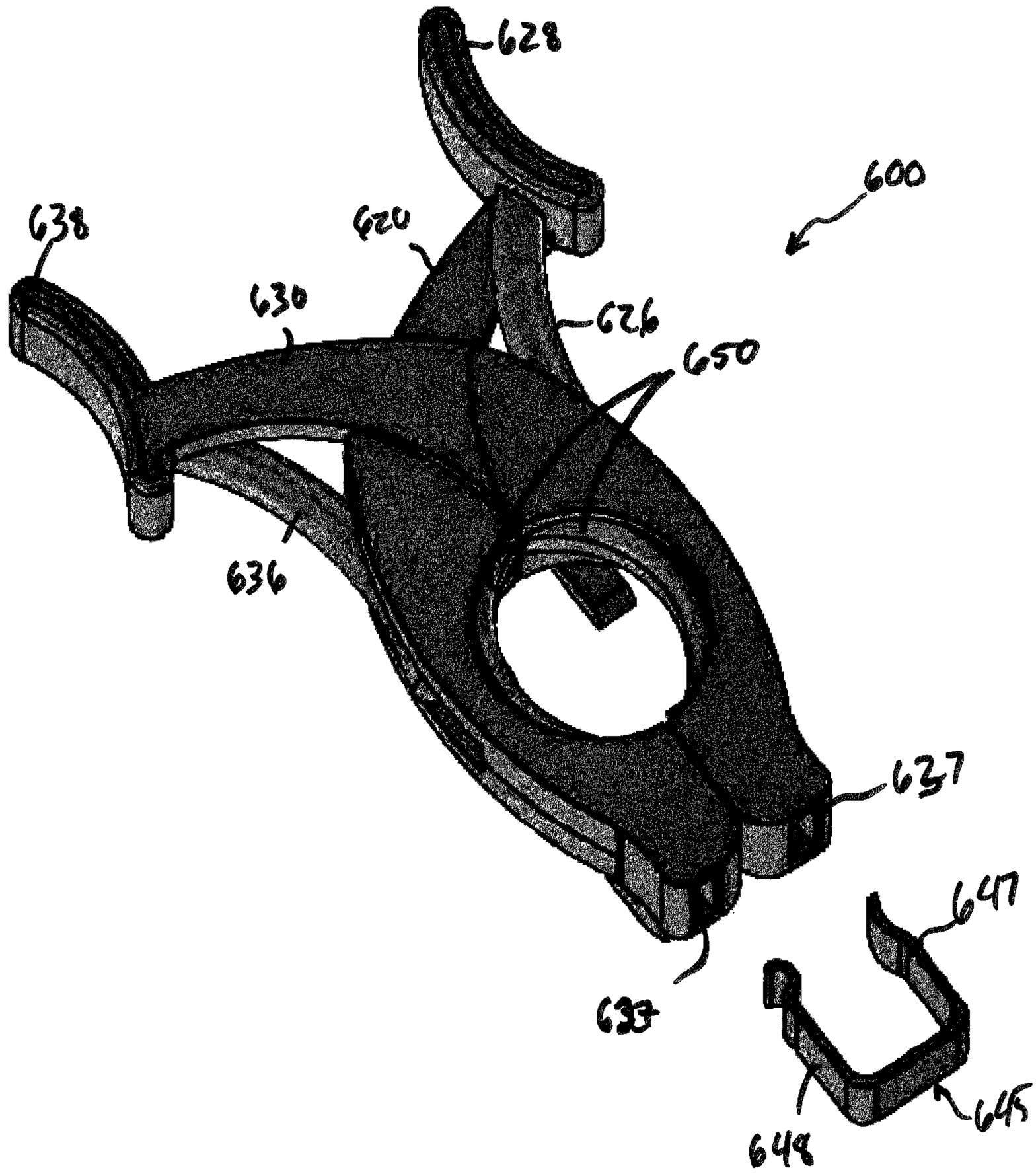

FIG. 19

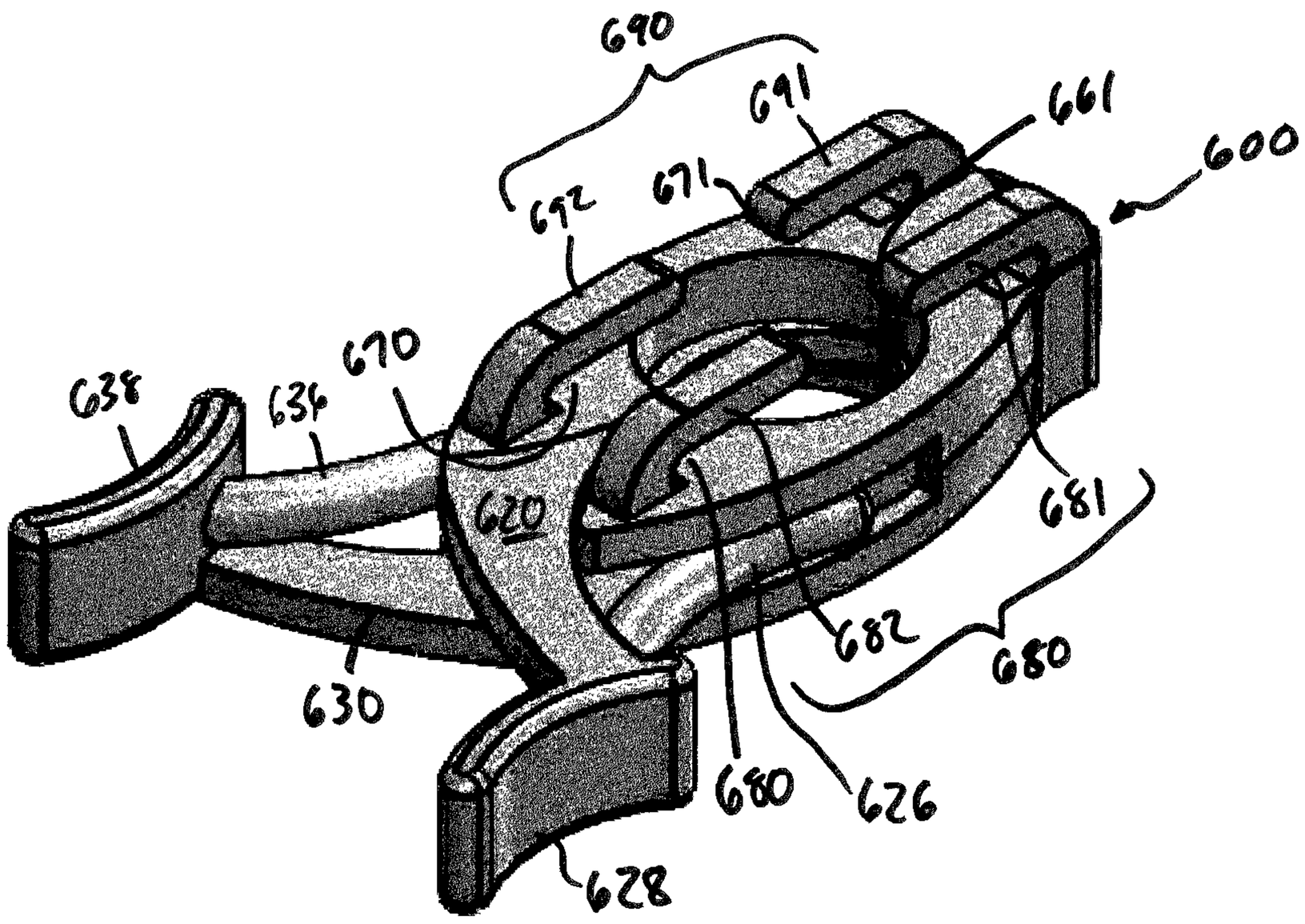
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FIG. 20

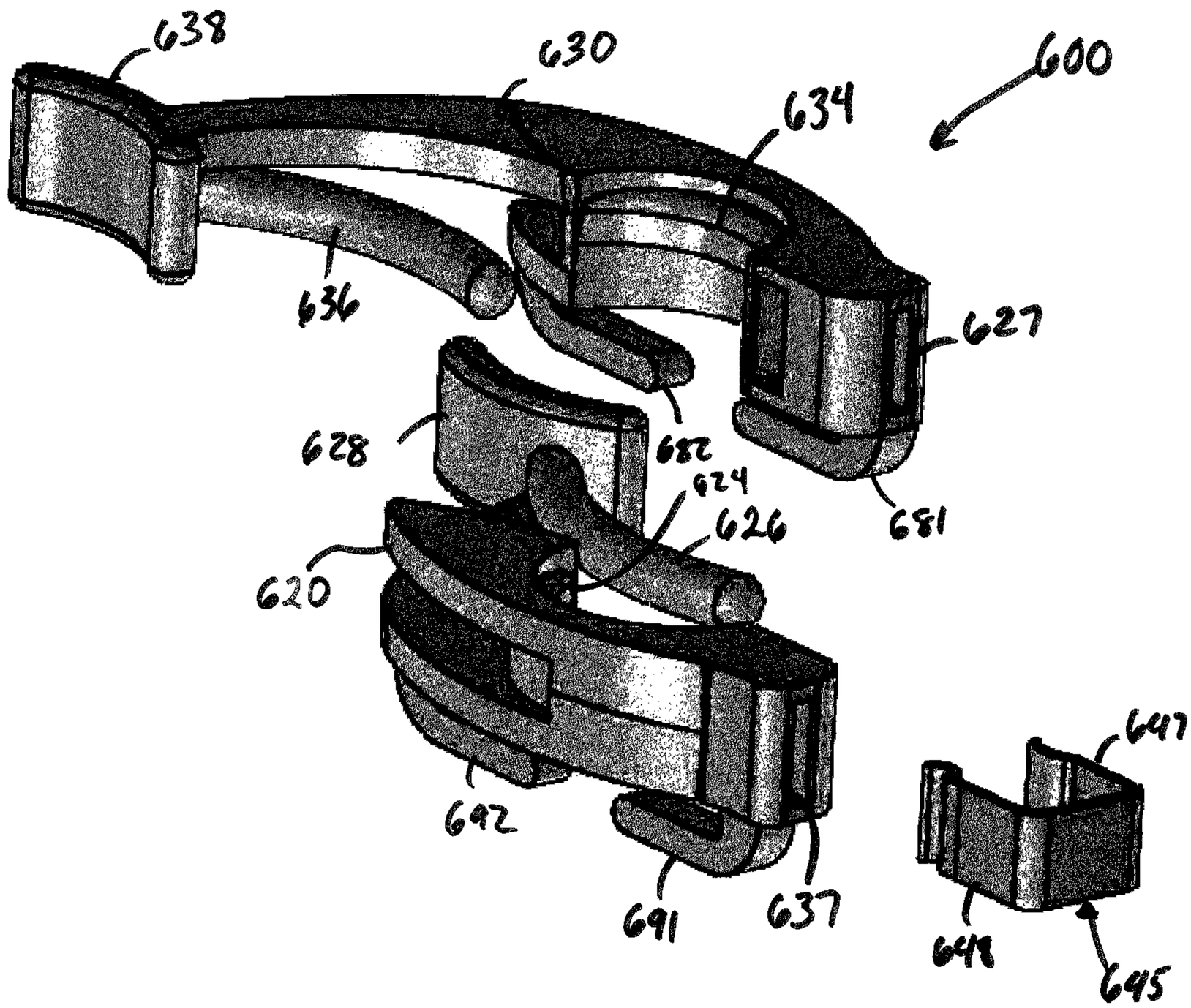
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FIG. 21

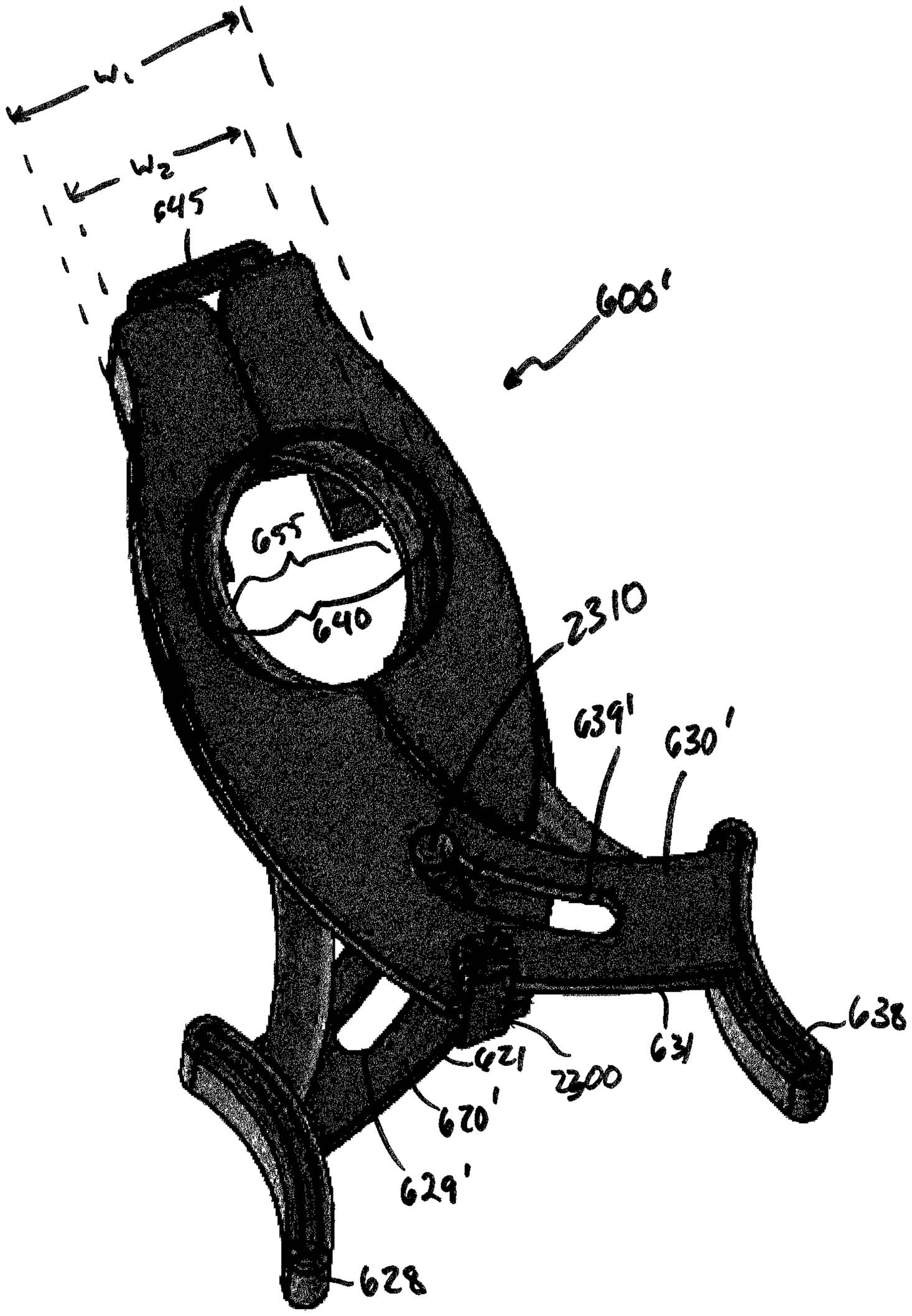

FIG. 22

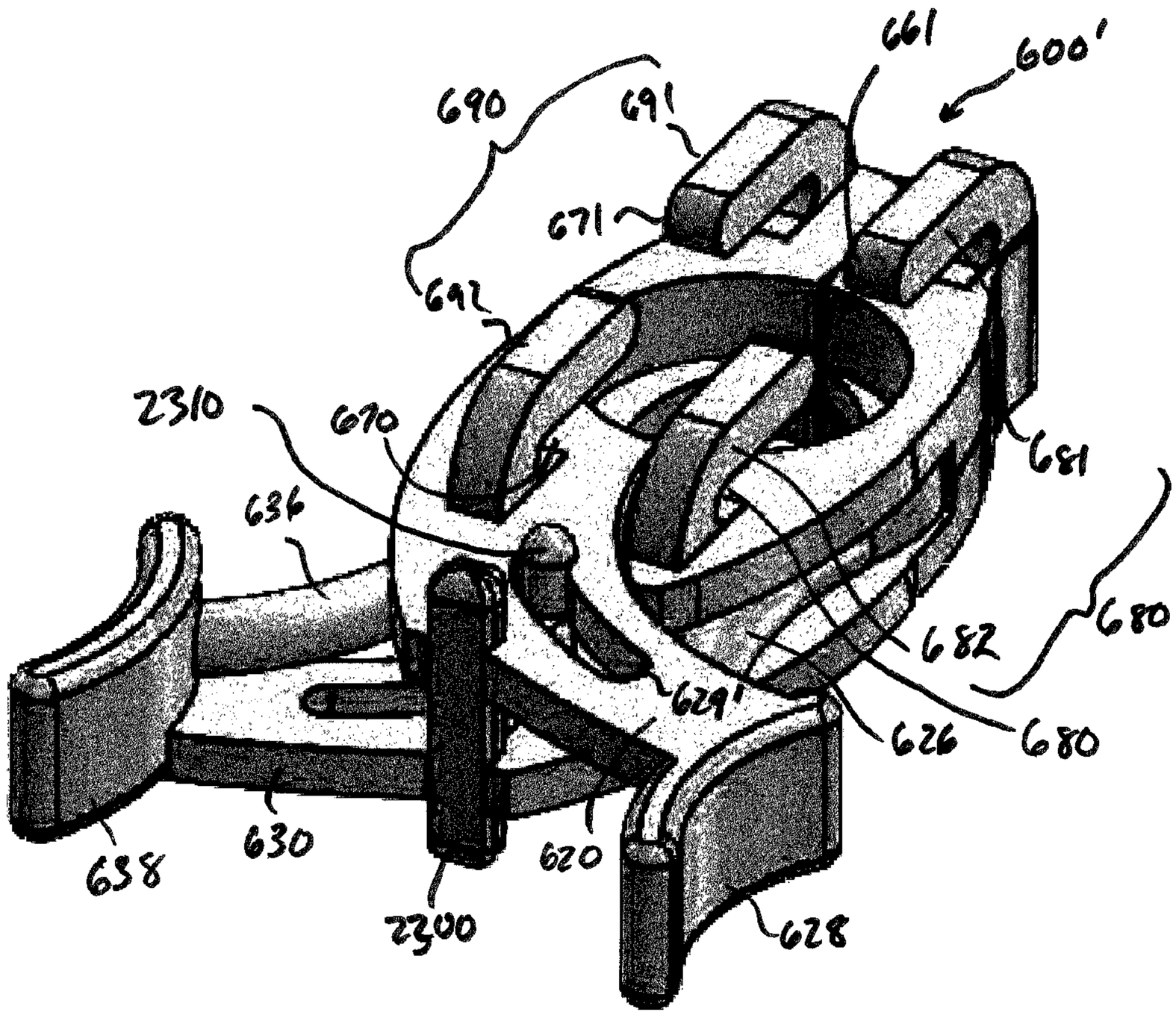
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FIG. 23

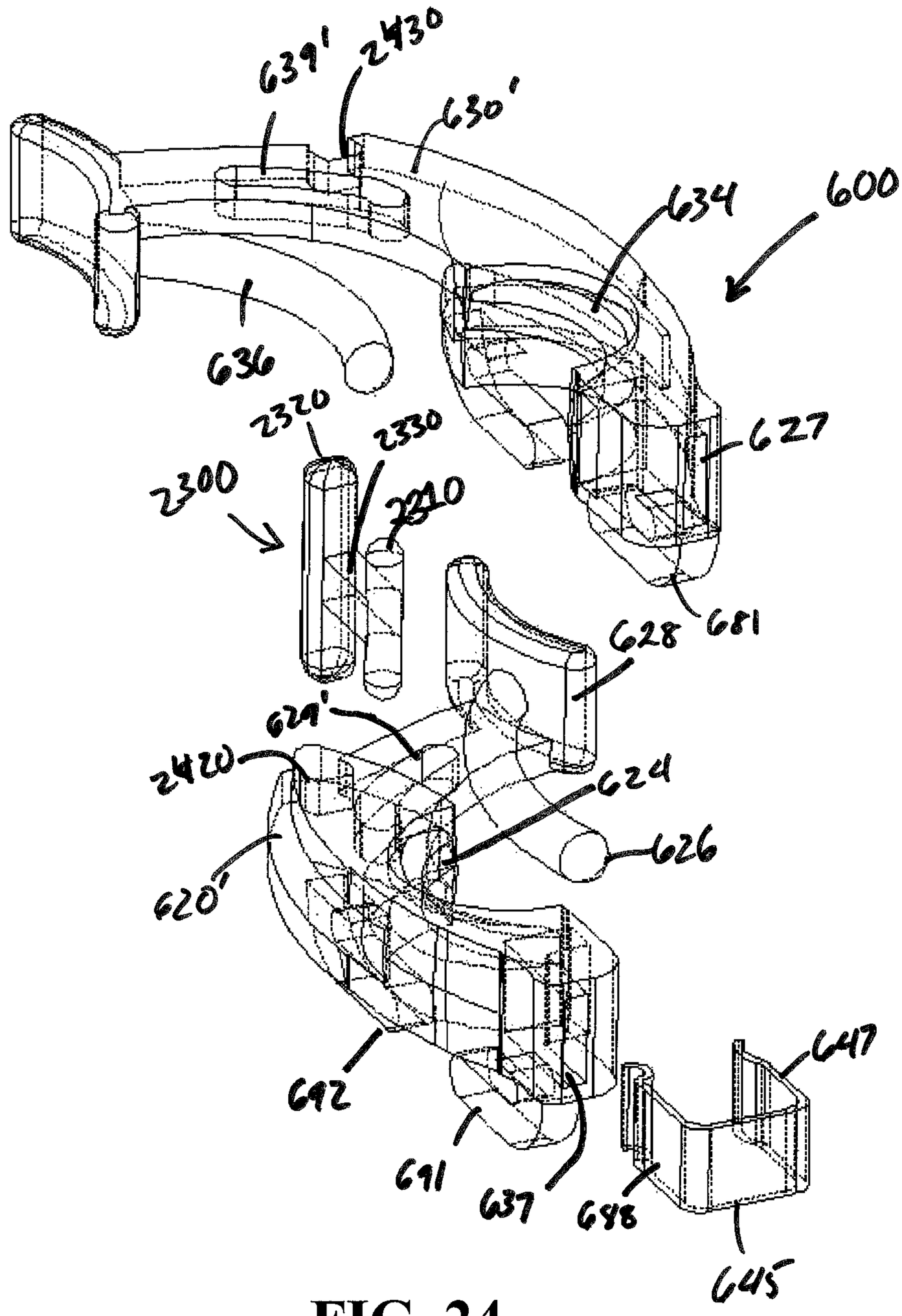
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FIG. 24

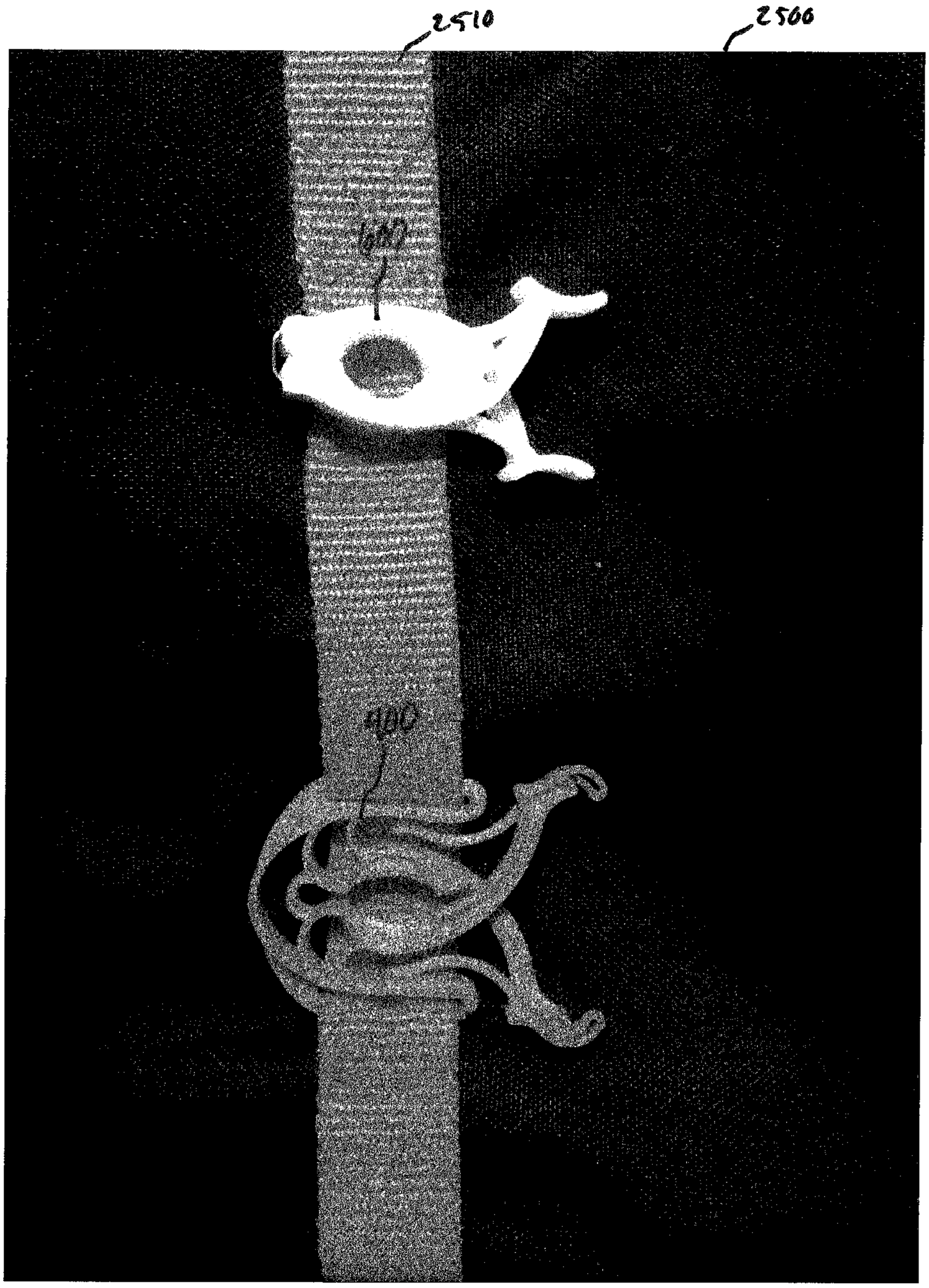

FIG. 25

CLASP

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation in part of U.S. application Ser. No. 14/355,887, entitled "Clasp," and filed May 2, 2014, which is a national phase application of International Patent Application No. PCT/US2012/063244, filed Nov. 2, 2012 and entitled "Clasp," which claims the benefit of U.S. Provisional Application No. 61/628,740, filed Nov. 4, 2011, the contents of which applications are incorporated herein by reference.

FIELD OF THE INVENTION

The disclosure relates generally to a clasp and more particularly to a clasp securable to a bag, the clasp comprising a receiving portion and a protrusion portion.

BACKGROUND OF THE INVENTION

Conventional bags, such as backpacks, often include multiple compartments and pockets for storing items. This configuration is often cumbersome, particularly when a user is not utilizing all or part of the storage space. One means of addressing the unused space is to have a bag with removable storage components. Conventional bags having removable storage components use attachment mechanisms for securing the storage components to the bag. Unfortunately, many of these attachment mechanisms are cumbersome and inefficient with regards to use, often making it harder to secure and remove the storage component than to use the bag with the excess compartments and storage pockets.

For example, storage compartments having zippers would require alignment of each side of the zipper and then the use of more than one hand to connect the storage compartment to the main bag body. Storage compartments employing a known clasp or clasps, typically with a spring, can also be inefficient to use in the sense that they often require two hands to operate.

Accordingly, a need exists for a clasp or springless clasp that can secure a first object to a second object with relative ease and speed. Moreover, the need exists for a clasp having a latch mechanism that can be operated with one hand.

SUMMARY OF THE INVENTION

In accordance with an aspect of the present invention, there is provided clasp. The clasp includes a protrusion portion having a protrusion and a receiving portion having a body, a first arm, and a second arm. The first and second arms define a receiving cavity configured to receive the protrusion of the protrusion portion. The first arm is connected to the body by a plurality of first flexible connectors. The second arm is connected to the body by a plurality of second flexible connectors. The protrusion is removably received in the cavity to engage the protrusion portion with the receiving portion.

In accordance with another aspect of the present invention, there is provided another clasp. The clasp includes a protrusion portion having a protrusion and a receiving portion having a spring assembly, a first arm, and a second arm defining a receiving cavity configured to receive the protrusion of the protrusion portion. The first arm and the second arm are biased toward one another by the spring assembly to resist opening of the cavity. The protrusion is removably received in the cavity to engage the protrusion portion with the receiving portion.

In accordance with yet another aspect of the present invention, there is provided yet another clasp. The clasp includes a protrusion portion having a protrusion and a receiving portion having a body, a first arm, a second arm, and a clip. The first and second arms define a receiving cavity configured to receive the protrusion of the protrusion portion. The clip secures the first arm to the second arm. The protrusion is removably received in the cavity to engage the protrusion portion with the receiving portion.

BRIEF DESCRIPTION OF THE DRAWINGS

For the purpose of illustration, there are shown in the drawings certain embodiments of the present invention. In the drawings, like numerals indicate like elements throughout. It should be understood that the invention is not limited to the precise arrangements, dimensions, and instruments shown. In the drawings:

FIG. **1** is a front perspective view of a bag having at least one bag pocket attached with at least one clasp;

FIG. **2** is a front perspective view of the configurable bag of FIG. **1** with the at least one bag pocket having been removed;

FIG. **3** is a front perspective view of the configurable bag of FIG. **1** with at least two bag pockets attached horizontally;

FIG. **4** is an exploded, front perspective view of the clasp in accordance with an exemplary embodiment;

FIG. **5** is a front perspective engaged view of the clasp shown in FIG. **4**;

FIG. **6** is a top view of a receiving portion the clasp shown in FIG. **4** with first and second arms compressed;

FIG. **7** is a bottom view of the receiving portion of the clasp shown in FIG. **6**;

FIG. **8** is an exploded, front perspective view of a protrusion portion of a clasp according to another embodiment;

FIG. **9** is a top view of a receiving portion of the clasp according to another embodiment;

FIG. **10** is a side, exploded view of the clasp according to another embodiment;

FIG. **11** is a top, perspective view of the clasp according to the another embodiment with the protrusion portion and the receiving portion engaged;

FIG. **12** is a perspective view of another embodiment of a clasp comprising a receiving portion and a protrusion portion, the receiving portion and the protrusion portion separated from one another, in accordance with an exemplary embodiment of the present invention;

FIG. **13** is a perspective view of the clasp of FIG. **12** in which the protrusion portion is secured within the receiving portion, in accordance with an exemplary embodiment of the present invention;

FIG. **14** is a top view of the receiving portion of the clasp of FIG. **12**, in accordance with an exemplary embodiment of the present invention;

FIG. **15** is a perspective view of yet another embodiment of a receiving portion, in accordance with an exemplary embodiment of the present invention;

FIG. **16** is a top view of the receiving portion of FIG. **15**, in accordance with an exemplary embodiment of the present invention;

FIG. **17** is an exploded view of the receiving portion of FIG. **15**, in accordance with an exemplary embodiment of the present invention;

FIG. **18** is a perspective view of still another embodiment of a receiving portion, in accordance with an exemplary embodiment of the present invention;

FIG. **19** is a partially exploded view of the receiving portion of FIG. **18**, in accordance with an exemplary embodiment of the present invention;

FIG. **20** is a rear perspective view of the receiving portion of FIG. **18**, in accordance with an exemplary embodiment of the present invention;

FIG. **21** is an exploded view of the receiving portion of FIG. **18**, in accordance with an exemplary embodiment of the present invention;

FIG. **22** is a perspective view of still yet another embodiment of a receiving portion comprising a locking component, in accordance with an exemplary embodiment of the present invention;

FIG. **23** is a rear perspective view of the receiving portion of FIG. **22**, in accordance with an exemplary embodiment of the present invention;

FIG. **24** is an exploded view of the receiving portion of FIG. **22**, in accordance with an exemplary embodiment of the present invention; and

FIG. **25** is a view of a bag comprising a strap on which the receiving portions of FIGS. **12** and **18** are secured, in accordance with an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Reference to the drawings illustrating various views of exemplary embodiments of the present invention is now made. In the drawings and the description of the drawings herein, certain terminology is used for convenience only and is not to be taken as limiting the embodiments of the present invention. Furthermore, in the drawings and the description below, like numerals indicate like elements throughout.

Referring to FIGS. **1-3**, an exemplary embodiment of a configurable bag **100** having at least one component **102** removably associable therewith is illustrated. The component **102** may be a bag, pouch, water bottle, etc. In this configuration, the bag **100** is a backpack and includes a main bag body **104** with a front panel and a back panel. The bag **100** includes at least one bag pocket **102** attached thereto with a springless clasp **200** as well as a second bag pocket **106** attached adjacent the first bag pocket **102**, also with a springless clasp **200**. As seen in FIG. **1**, the bag pockets **102**, **106** are aligned vertically, with long ends disposed essentially parallel to a longitudinal axis of the bag.

Referring to FIGS. **2** and **3**, the bag pockets **102**, **106** can be removed from the vertical alignment (FIG. **2**) and can also be arranged horizontally (FIG. **3**) with long ends disposed essentially orthogonal to the longitudinal axis of the bag, such that the first bag pocket **102** is disposed above the second bag pocket **106** by activating alternative clasps **200** variously placed along the front panel of the main bag body **104**.

Referring to FIGS. **4-7**, an example of a clasp **200** used to attach the bag pockets **102**, **106** to the main bag body **104** are shown in greater detail. The clasp **200** includes a protrusion portion **202** and a receiving portion **204**. The protrusion portion **202** includes a protrusion **206** configured to be received by a cavity **208** defined by the receiving portion **204**. The protrusion **206** is circular and raised from the surface of the protrusion base **210**. The protrusion **206** is securable in the cavity **208** by a frictional fitting of the protrusion **206** into the cavity **208**. The frictional fitting of the protrusion **206** into the cavity **208** creates a secure association of the at least one bag pocket **102** to the main bag body **104**.

As shown in the Figures, the protrusion **206** includes a major protrusion diameter **212** and a minor protrusion diameter **214**. The cavity **208** of the receiving portion is slightly smaller (or perhaps the same) in width than the major diameter **212** and slightly larger in width than the minor diameter **214**. The width of the cavity **208** relative to the respective lengths of the major protrusion diameter **212** and minor protrusion diameter **214** facilitate the frictional fitting discussed above. The cavity **208** expands to a first size larger than or equal to the major protrusion diameter **212** and closes to a second size substantially equal to the minor protrusion diameter **214** as the protrusion **206** is pushed through and into the cavity **208**. In an exemplary embodiment, the minor protrusion diameter **214** is adjacent the protrusion base **210**.

As seen in FIG. **4**, each receiving portion **204** includes a first arm **216** and a second arm **218** extending from a base **220** of the receiving portion **204**. In an exemplary embodiment, portions of the first and second arms **216**, **218** define the cavity **208**. More specifically, the first arm **216** includes a first arcuate recess **222** and the second arm **218** includes a second arcuate recess **224** opposing the first arcuate recess **222**. Each of the first and second arms **216**, **218** could also include additional recesses wherein the third arcuate recess is adjacent the first arcuate recess **222** and the fourth arcuate recess is adjacent the second arcuate recess **224**. The first and second arcuate recesses **222**, **224** define the width of the cavity **208**, which, as will be discussed in greater detail below, is adjustable via actuation of the arms **216**, **218**.

The cavity **208** includes a first width **226**, as seen in FIG. **5**, when the first and second arms **216**, **218** are disposed in a resting position (as is also shown in FIG. **4**). The first width **226** is adjustable into a second width **228**, as seen in FIG. **7**, when a compressing force is applied to the first arm **216** and the second arm **218** such that a distance between the furthest extents **234** and **236** of the first arm **216** and second arm **218** is decreased. The second width **228** of the cavity **208** is greater than the first width **226** of the cavity **208**, and perhaps more importantly, the second width **228** is greater than the major protrusion diameter **212** so as to allow the protrusion **206** to be released from the cavity **208** via a compressive force applied to the first arm **216** and the second arm **218**.

As seen in FIG. **4**, the first arm **216** is horizontally and vertically displaced from the second arm **218** such that the first arm **216** is biased against the second arm **218** and the second arm **218** is biased against the first arm **216**.

When the first arm **216** and second arm **218** are released and the user disengages the extents **234**, **236**, the second width **228** of the cavity adjusts into the first width **226** to secure the protrusion **206**. The clasp **200** and its components may be made of a resilient plastic or metal material having a tendency to create a spring effect allowing the arms **216**, **218** to easily move between compressed and released positions.

The protrusion portion **202** is affixed to a first object or a second object such as the main bag body **104** or to the at least one bag pocket **102** via a sewing, adhering, or strapping of the protrusion portion **202** to the first object or the second object such as the main bag body **104** or the at least one bag pocket **102**. The receiving portion **204** is affixed to a first object or a second object such as the main bag body **104** or the at least one bag pocket **102** via a sewing, adhering, or

strapping of the protrusion portion **202** to the first object or the second object such as the main bag body **104** or the at least one bag pocket **102**.

As seen in FIG. **4**, the protrusion portion **202** may also include at least one strap slot **230**. The strap slot **230** is configured for receiving a strap or similar attachment element and affixing the protrusion portion **202** to at least one strap associated with a first object or a second object such as the main bag body **104** or the at least one bag pocket **102**. Additionally, the receiving portion **204** may also include at least one strap slot **232**. This strap slot **232** is also configured for receiving a strap or similar attachment element and affixing the protrusion portion **204** to at least one strap associated with the first object or the second object such as the main bag body **104** or the at least one bag pocket **102**. The strap slots **230**, **232** can be used for sewing or similarly attaching the protrusion portion **202** and/or receiving portion **204** to the main bag body **104** or the at least one bag pocket **102**. While the illustrated strap slots **230**, **232** are rectangular shaped, they could be any shape that would accommodate attachment to a related device.

As illustrated in FIGS. **1** and **3**, an additional feature of the clasp **200** is the ability to connect the at least one bag pocket **102** in a vertical or horizontal orientation. Turning to FIG. **1**, the bag pockets **102** are disposed vertically with respect to the longitudinal axis of the bag **100**. As seen in FIG. **3**, the bag pockets **102** are disposed horizontally with long ends disposed essentially perpendicular to the longitudinal axis of the bag. This is accomplished with the plurality of clasps **200**. Specifically, one of the receiving portions **204** or protrusion portions **202** are embedded in the main bag body **104** and the other of the protrusion portions **202** or receiving portions **204** are secured to the bag pockets **102**.

As seen in FIG. **2**, the clasps **200** are evenly spaced along the main bag body **104** to account for the bag pockets **102** being disposed horizontally or vertically depending on which receiving portions **204** are engaged by the protrusion portions **202** (and vice versa).

Referring to FIG. **8**, another embodiment of a protrusion portion **302** will now be discussed. The protrusion portion **302** includes the same or similar features and configurations as that of portion **202**, except where otherwise noted. In this embodiment **302**, the protrusion **306** is removably associated with the protrusion base **310**. In an exemplary embodiment, this removable association is accomplished via a screw **309** or other threaded attachment mechanism extending from the protrusion **306** and being threadable into the base **310**. Via this embodiment, the protrusion **306** can be removed from the base **310** and threadingly attached to a device with a corresponding thread receiving cavity (i.e., camera, mobile phone case, or the like). Thereby, the protrusion **306** could be received in a cavity **308** of a corresponding receiving portion **304** in order to attach such a device. Of course, other attachment features besides thread association, such as but not limited to snaps, hook and loop material, adhesion, and other frictional fits, may also be used to removably associate the protrusion **306** with the base **301**.

Referring to FIGS. **9-11**, a full clasp **300** (showing the protrusion portion **302** by way of example, though any protrusion portion discussed herein may be used) including a receiving portion **304** is shown. As with the above discussed protrusion portion **302** this receiving portion **304** includes the same or similar features and configurations as that of portion **202**, except where otherwise noted.

The receiving portion **304** in this exemplary embodiment includes a second cavity **340** in addition to and disposed adjacent the first cavity **308** (please see FIG. **9**). The second cavity **340** is used in connection with a first attachment mechanism, such as a nail, for attaching the receiving portion **304** to a first object, such as a wall. Optionally, the receiving portion **304** can be rotated around the axis of the first attachment mechanism if a user intends to reposition the receiving portion **304**. Thus, the clasp **300** can be used to mount an object on the first object, such as hanging a picture on a wall.

The clasp receiving portion **304** further includes a third cavity **342** disposed adjacent the second cavity **340**. The third cavity **342** is used in connection with a second attachment mechanism, such as a nail, for securing the receiving portion **304** to the first object, such as the wall. The third cavity **342** is used for stabilizing the receiving portion **304** to prevent the receiving portion from spinning around the axis of the first attachment mechanism.

As illustrated in the exemplary embodiments of FIGS. **8-11**, the protrusion portion **302** includes at least one strap slot **330** with a C-shaped configuration, and the receiving portion **304** also includes at least one strap slot **332** with a C-shaped configuration. These C-shaped configurations are formed via perpendicular openings **331** and **332**, which communicate respective slots **330** and **332** the ambient environment disposed laterally to the clasp **300**. These C-shaped configurations allows straps to be pinched or squeezed together and received in the respective slots **330** and **332** in either the receiving portion **304** or the protrusion portion **302**.

Referring to FIGS. **12-15**, there is illustrated a full clasp **1200** comprising a receiving portion **400** and a protrusion portion **490**, in accordance with an exemplary embodiment of the present invention. The receiving portion **400** comprises a body **410**, a first arm **420**, and a second arm **430** extending from the body **410**. The first arm **420** and the second arm **430** are curved and cross one another.

In an exemplary embodiment, portions of the first arm **420** and the second arm **430** define a cavity **440**. More specifically, the first arm **420** has an outer surface **421** and an inner surface **423**, the inner surface **423** including an arcuate recess **422**, and the second arm **430** has an outer surface **431** and an inner surface **433**, the inner surface **433** including an arcuate recess **432**. The arcuate recesses **422** and **432** oppose one another to form the cavity **440**.

In a further exemplary embodiment, portions of the first arm **420** and the second arm **430** define a lower ledge **450** in the cavity **440**. Specifically, the first arm **420** further comprises a ledge **424** defined by an arcuate recess **422**, and the second arm **430** further comprises a ledge **434** defined by an arcuate recess **432**. The ledges **424** and **434** form the lower ledge **450** in the cavity **440**. The ledge **450** comprises a gap **455** between the ledges **424** and **434**.

The protrusion portion **490** comprises a base **495** and a protrusion **496** configured to be received by the cavity **440** defined by the receiving portion **400**. The protrusion **496** is circular and raised from an upper surface **490**A of the protrusion base **495**. The protrusion **490** is securable in the cavity **440** by a frictional fitting of the protrusion **496** into the cavity **440**. The frictional fitting of the protrusion **496** into the cavity **440** creates a secure association of the at least one bag pocket **102** to the main bag body **104**.

The arcuate recesses **422**, **432** define a width, w_1, of the cavity **440**, which, as will be discussed in greater detail below, is adjustable via actuation of the arms **420**, **430**. The arcuate recesses **425**, **435** define a width, w_2, of the gap **455**.

The widths, w_1 and w_2, have a first value when the first and second arms **420**, **430** are disposed in a resting position, as is illustrated in FIGS. **12-14**. The widths, w_1 and w_2, are

adjustable into a second, greater value when a compressing force is applied to the first arm **420** and the second arm **430** such that a distance between the furthest extents **428** and **438** of the first arm **420** and second arm **430**, respectively, is decreased. The second value of the width, w_1, of the cavity **440** is greater than the first value of the width, w_1, of the cavity **440**, and the second value of the width, w_2, is greater than the diameter, d_1, of the protrusion **496** of the protrusion portion **490** so as to allow the protrusion **496** to be released from the cavity **440** (or placed into and secured in the cavity **440**) via a compressive force applied to the first arm **420** and the second arm **430**.

The first arm **420** further comprises a spring extension **426** extending from the furthest extent **428**, and the second arm **430** further comprises a spring extension **436** extending from the furthest extent **438**. When the first and second arms **420**, **430** are disposed in the resting position illustrated in FIGS. **12-14**, the spring extensions **426**, **436** may also be in a resting position, as illustrated in FIGS. **12-14**. When a compressing force is applied to the first arm **420** and the second arm **430**, the spring extension **426** makes contact with the outer surface **421** of the first arm **420**, and the spring extension **436** makes contact with the outer surface **431** of the second arm **430**. When in contact with the respective outer surfaces **421**, **431**, the spring extensions **426**, **436** resist the compression forced applied to the first arm **420** and the second arm **430** to urge the widths, w_1 and w_2, to return to their first values.

When the first arm **420** and second arm **430** are released and the user disengages the extents **428**, **438**, the spring extensions **426**, **436** urge the widths, w_1 and w_2, to return to their first values. The receiving portion **400** and its components may be made of a resilient plastic or metal material having a tendency to create a spring effect allowing the arms **420**, **430** to easily move between compressed and released positions.

As with the protrusion **206**, the protrusion **496** includes a major protrusion diameter, d_1, and a minor protrusion diameter, d_2. The first value of the width, w_1, of the cavity **440** of the receiving portion **400** is slightly larger (or perhaps the same) than the major protrusion diameter, d_1. The first value of the width, w_2, of the gap **455** of the receiving portion **400** is slightly larger (or perhaps the same) than the minor protrusion diameter, d_2. The widths of the cavity **440** and the gap **455** relative to the respective major protrusion diameter, d_1, and minor protrusion diameter, d_2, trap the protrusion **496** within the cavity **440**.

When a compressing force is applied to the first arm **420** and the second arm **430**, the widths, w_1 and w_2, increase from their first values. When the width, w_2, of the gap **455** exceeds the diameter, d_1, of the protrusion **496**, the protrusion **496** may be disposed within the cavity **440**. When the compressing force is removed from to the first arm **420** and the second arm **430**, the widths, w_1 and w_2, return to their first values. The width, w_2, of the gap **455** reduces to the first value to secure the protrusion **496** in the cavity **440**.

The protrusion portion **490** also comprises a strap slot **491** and a strap slot **492**. The strap slot **491** comprises an opening **493** for receiving a portion of a strap, and the strap slot **492** comprises an opening **494** for receiving another portion of the same strap or another strap. Each strap slot **491**, **492** is formed from a respective pair of extensions that extend outwardly from the base **495** and curve toward one another but do not touch so that they form respective openings **493**, **494** therebetween.

The receiving portion **400** also comprises a first C-shaped strap retainer formed in a first side portion **411** of the body **410**. The first C-shaped strap retainer is formed from two extensions of the body **410** that extend outwardly and curve toward one another but are separated from one another by a gap or opening **461** for receiving a portion of a strap. The extensions define a strap slot **460** for a portion of a strap. The portion of the strap is retained in the slot **460** by the first C-shaped strap retainer and cannot escape unless removed by the user.

The receiving portion **400** also comprises a second C-shaped strap retainer formed in a second side portion **412** of the body **410**. The second C-shaped strap retainer is formed from two further extensions of the body **410** that extend outwardly and curve toward one another but are separated from one another by a gap or opening **471** for receiving another portion of the strap. The extensions define a strap slot **470** for the other portion of the strap. Such other portion of the strap is retained in the slot **470** by the second C-shaped strap retainer and cannot escape unless removed by the user.

The receiving portion **400** is generally flat and lies in a first plane. The portions **411** and **412** lie within the first plane but are also aligned with one another in respective parallel second planes that are perpendicular to the first plane. A strap may be disposed within the strap slots **460** and **470** by orienting it in a third plane that is perpendicular to such first and second planes. So oriented, the strap is inserted while perpendicular to the openings **461** and **471** so that the strap may be slid into the strap slots **460** and **470**. In an exemplary embodiment, the strap slots **460** and **470** are parallel to one another and to a longitudinal axis of the receiving portion **400**.

The body **410** further comprises curved support connections **441**, **442**, **443**, **444**, and **446**. The first arm **420** is connected to the body **410** by the first and second support connections **441** and **443**. Specifically, the support connections **441** and **443** connect the first arm **420** in the vicinity of the cavity **440** to the first portion **411** of the body **410**. The support connection **441** connects a portion of the arm **430** near a distal end of the arm **430** to a portion of the body **410** near a distal end of the first portion **411** of the body **410**. The support connection **443** connects the extreme distal end of the arm **430** to the extreme distal end of the first portion **411** of the body **410**. The second arm **430** is connected to the body **410** by the third and fourth support connections **442** and **444**. Specifically, the support connections **442** and **444** connect the second arm **430** in the vicinity of the cavity **440** to the second portion **412** of the body **410**. The support connection **442** connects a portion of the arm **420** near a distal end of the arm **420** to a portion of the body **410** near a distal end of the second portion **412** of the body **410**. The support connection **444** connects the extreme distal end of the arm **420** to the extreme distal end of the second portion **412** of the body **410**.

The connectors **443** and **444** are connected to one another by the central support connection **446**. The support connections **441-444** and **446** are curved and sized to be flexible relative to the arms **420** and **430**. A central portion **414** of a top portion **413** of the body **410** is also sized to be flexible relative to the rest of the body **410**. When a compressing force is applied to the first arm **420** and the second arm **430**, the support connections **441-444** and **446** and the central portion **414** of the top portion **413** of the body **410** flex to allow the widths, w_1 and w_2, to increase. However, the support connections **441-444** and **446** and the central portion **414** of the top portion **413** of the body **410** resist such flexing. When the compressing force is removed from the first arm **420** and the second arm **430**, the support connec-

tions **441-444** and **446** and the central portion **414** of the top portion **413** of the body **410** urge the furthest extents **428** and **438** of the respective arms **420** and **430** away from one another, thereby causing the widths, w_1 and w_2, to decrease and the cavity **440** to close. Accordingly, the support connections **441-444** and **446** and the central portion **414** of the top portion **413** of the body **410** bias the arms **420** and **430** to close to reliably retain the protrusion **496** within the cavity **440** when no force is applied to the arms **420** and **430**. The user must press the arms **420** and **430** inwardly toward one another against the bias of the support connections **441-444** and **446** and the central portion **414** of the top portion **413** of the body **410** to open the cavity **440** so that the protrusion **496** can be inserted or removed. Accordingly, the support connections **441-444** and **446** and the central portion **414** of the top portion **413** of the body **410** lend added support and strength to the arms **420** and **430**.

In an exemplary embodiment, the receiving portion **400** is formed as a unitary structure. Thus, the body **410** and the arms **420** and **430** are formed as a unitary structure made from a single material. In an exemplary embodiment the support connections **441-444** and **446** are thin members sized to be flexible. The receiving portion **400** may be formed from a flexible plastic to provide for the flexibility of the support connections **441-444** and **446**. Any known flexible plastic, such as nylon, polypropylene, etc., may be used for the receiving portion **400**. Alternatively, the receiving portion **400** may be formed from a metal, such as aluminum, spring steel, etc. It is also contemplated that the receiving portion **400** may be formed from materials other than plastics or metals. Such other materials may include carbon fibers, Kevlar® weaves, etc.

Referring to FIGS. **15-17**, there is illustrated a receiving portion **500** for use in a clasp comprising the receiving portion **500** and the protrusion portion **490**, in accordance with an exemplary embodiment of the present invention. The receiving portion **500** is configured for receiving a protrusion of a protrusion portion, such as the protrusion **496** of the protrusion portion **490**. The receiving portion **500** comprises a spring assembly **510**, a first arm **520**, a second arm **530**, and a spring clamp **545**.

In an exemplary embodiment, portions of the first arm **520** and the second arm **530** define a cavity **540**. More specifically, the first arm **520** has an outer surface **521** and an inner surface **523**, the inner surface **523** including an arcuate recess **522**, and the second arm **530** has an outer surface **531** and an inner surface **533**, the inner surface **533** including an arcuate recess **532**. The arcuate recesses **522** and **532** oppose one another to form the cavity **540**.

In a further exemplary embodiment, portions of the first arm **520** and the second arm **530** define a lower ledge **550** in the cavity **540**. Specifically, the first arm **520** further comprises a ledge **524** defined by an arcuate recess **525**, and the second arm **530** further comprises a ledge **534** defined by an arcuate recess **535**. The ledges **524** and **534** form the lower ledge **550** in the cavity **540**. The ledge **550** comprises a gap **555** between the ledges **524** and **534**.

The arcuate recesses **522**, **532** define the width, w_1, of the cavity **540**, which, as will be discussed in greater detail below, is adjustable via actuation of the arms **520**, **530**. The arcuate recesses **525**, **535** define the width, w_2, of the gap **555**.

The widths, w_1 and w_2, have a first value when the first and second arms **520**, **530** are disposed in a resting position, as is illustrated in FIGS. **15-17**. The widths, w_1 and w_2, are adjustable into a second, greater value when a compressing force is applied to the first arm **520** and the second arm **530** such that a distance between the furthest extents **528** and **538** of the first arm **520** and second arm **530**, respectively, is decreased. The second value of the width, w_1, of the cavity **540** is greater than the first value of the width, w_1, of the cavity **540**, and the second value of the width, w_2, is greater than the diameter, d_1, of the protrusion **496** of the protrusion portion **490** so as to allow the protrusion **496** to be released from the cavity **540** (or placed into and secured in the cavity **540**) via a compressive force applied to the first arm **520** and the second arm **530**.

The first arm **520** further comprises a curved extension **590** on which slot extensions **591** and **592** are disposed. The slot extensions **591**, **592** form a C-shaped strap slot **570** having an opening **571**. The second arm **530** further comprises a curved extension **580** on which slot extensions **581** and **582** are disposed. The slot extensions **581**, **582** form a C-shaped strap slot **560** having an opening **561**.

The spring assembly **510** comprises a pin **511**, a first spring **512**, a second spring **513**, a first washer **514**, and a second washer **515**. A first end of the pin **511** is secured to an end **583** of the curved extension **580**, and a second end of the pin **511** is secured to an end **593** of the curved extension **590**. The spring **512** is disposed about the pin **511** between the end **583** of the curved extension **580** and the outer surface **531** of the arm **530**. The spring **513** is disposed about the pin **511** between the end **593** of the curved extension **590** and the outer surface **521** of the arm **520**. The pin **511** passes through passageways **526** and **536** in the respective arms **520** and **530**. The washer **514** prevents the spring **512** from entering the passageway **536**, and the washer **515** prevents the spring **513** from entering the passageway **526**.

When the first and second arms **520**, **530** are disposed in the resting position illustrated in FIGS. **15-17**, the springs **511**, **512** may be under moderate compression, as illustrated in FIGS. **15-17**, thereby maintaining the widths, w_1 and w_2, at their first values. When a compressing force is applied to the first arm **520** and the second arm **530**, the springs **511**, **512** are compressed further between their respective curved extensions **580**, **590** and washers **514**, **515** and resist the compression forced applied to the first arm **420** and the second arm **430** to urge the widths, w_1 and w_2, to return to their first values. When the first arm **520** and second arm **530** are released and the user disengages the extents **528**, **538**, the spring assembly **510** urge the widths, w_1 and w_2, to return to their first values.

When a compressing force is applied to the first arm **520** and the second arm **530**, the portions of the first arm **520** and the second arm **530** adjacent to the cavity **540** pivot away from one another, thereby opening the widths, w_1 and w_2, to their second values. When the width, w_2, of the gap **555** exceeds the diameter, d_1, of the protrusion **496**, the protrusion **496** may be disposed within the cavity **540**. When the compressing force is removed from to the first arm **4520** and the second arm **530**, the widths, w_1 and w_2, return to their first values. The width, w_2, of the gap **555** reduces to the first value to secure the protrusion **496** in the cavity **440**. To remove the protrusion **496** from within the cavity **440**, the compressing force is reapplied to the first arm **520** and the second arm **530** to open the cavity **540**.

The protrusion **496** of the protrusion portion **490** is securable in the cavity **540** by a frictional fitting of the protrusion **496** into the cavity **540**. The frictional fitting of the protrusion **496** into the cavity **440** creates a secure association of the at least one bag pocket **102** to the main bag body **104**.

The spring clamp **545** of the receiving portion **500** connects the arms **520**, **530** together and provides a pivot point between the arms **520**, **530**. The clamp **545** comprises arms **547** and **548** that are disposed within respective slots **527** and **537** at the top distal ends of the respective arms **520** and **530**. The clamp **545** is thus C-shaped. In an exemplary embodiment, the spring clamp **545** resists the arms **650**, **530** pivoting away from one another.

In an exemplary embodiment the curved extensions **580**, **590** are thin members sized to be flexible. The arms **520**, **530** may be formed from a flexible plastic to provide for the flexibility of the curved extensions **580**, **590**. Any known flexible plastic, such as nylon, polypropylene, etc., may be used for the arms **520**, **530**. Alternatively, the arms **520**, **530** may instead be formed from a metal, such as aluminum, spring steel, etc. It is also contemplated that the arms **520**, **530** may be formed from materials other than plastics or metals. Such other materials may include carbon fibers, Kevlar® weaves, etc.

Referring to FIGS. **18-21**, there is illustrated a receiving portion **600** for use in a clasp comprising the receiving portion **600** and the protrusion portion **490**, in accordance with an exemplary embodiment of the present invention. The receiving portion **600** is configured for receiving a protrusion of a protrusion portion, such as the protrusion **496** of the protrusion portion **490**. The receiving portion **600** comprises a first arm **620**, a second arm **630**, and a spring clamp **645**. The first arm **620** and the second arm **630** are generally flat (except for extensions **681**, **682**, **691**, and **692** discussed below) and lie in a plane.

In an exemplary embodiment, portions of the first arm **620** and the second arm **630** define a cavity **640**. More specifically, the first arm **620** has an outer surface **621** and an inner surface **623**, the inner surface **623** including an arcuate recess **622**, and the second arm **630** has an outer surface **631** and an inner surface **633**, the inner surface **633** including an arcuate recess **632**. The arcuate recesses **622** and **632** oppose one another to form the cavity **640**.

In a further exemplary embodiment, portions of the first arm **620** and the second arm **630** define a lower ledge **650** in the cavity **640**. Specifically, the first arm **620** further comprises a ledge **624** defined by an arcuate recess **625**, and the second arm **630** further comprises a ledge **634** defined by an arcuate recess **635**. The ledges **624** and **634** form the lower ledge **650** in the cavity **640**. The ledge **650** comprises a gap **655** between the ledges **624** and **634**.

The arcuate recesses **622**, **632** define the width, w_1, of the cavity **640**, which, as will be discussed in greater detail below, is adjustable via actuation of the arms **620**, **630**. The arcuate recesses **625**, **635** define the width, w_2, of the gap **655**.

The widths, w_1 and w_2, have a first value when the first and second arms **620**, **6530** are disposed in a resting position, as is illustrated in FIGS. **18-21**. The widths, w_1 and w_2, are adjustable into a second, greater value when a compressing force is applied to the first arm **620** and the second arm **630** such that a distance between the furthest extents **628** and **638** of the first arm **620** and second arm **630**, respectively, is decreased. The second value of the width, of the cavity **640** is greater than the first value of the width, w_1, of the cavity **640**, and the second value of the width, w_2, is greater than the diameter, d_1, of the protrusion **496** of the protrusion portion **490** so as to allow the protrusion **496** to be released from the cavity **640** (or placed into and secured in the cavity **640**) via a compressive force applied to the first arm **620** and the second arm **630**.

The first arm **620** further comprises a spring extension **626** extending from the furthest extent **628**, and the second arm **630** further comprises a spring extension **636** extending from the furthest extent **638**. When the first and second arms **620**, **630** are disposed in the resting position in FIGS. **18** and **20**, the spring extensions **626**, **636** may also be in a resting position, as illustrated in FIGS. **18** and **20**. When a compressing force is applied to the first arm **620** and the second arm **630**, the spring extension **626** makes contact with the outer surface **621** of the first arm **620**, and the spring extension **636** makes contact with the outer surface **631** of the second arm **630**. When in contact with the respective outer surfaces **621**, **631**, the spring extensions **626**, **636** resist the compression forced applied to the first arm **620** and the second arm **630** to urge the widths, w_1 and w_2, to return to their first values.

When the first arm **620** and second arm **630** are released and the user disengages the extents **628**, **638**, the spring extensions **626**, **636** urge the widths, w_1 and w_2, to return to their first values. The receiving portion **600** and its components may be made of a resilient plastic or metal material having a tendency to create a spring effect allowing the arms **620**, **6430** to easily move between compressed and released positions.

The protrusion **496** of the protrusion portion **490** is securable within the cavity **640** by a frictional fitting of the protrusion **496** into the cavity **640**. The frictional fitting of the protrusion **496** into the cavity **440** creates a secure association of the at least one bag pocket **102** to the main bag body **104**.

The spring clamp **645** of the receiving portion **600** connects the arms **620**, **630** together and provides a pivot point between the arms **620**, **630**. The clamp **645** is similar to the clamp **545**. The clamp **645** comprises arms **647** and **648** that are disposed within respective openings **627** and **637** of the respective arms **620** and **630**. In an exemplary embodiment, the spring clamp **645** resists the arms **620**, **630** pivoting away from one another.

Illustrated in FIG. **20** is a view of the rear of the receiving portion **600**, in accordance with an exemplary embodiment of the present invention. Disposed on the rear of the arm **620** are extensions **691** and **692**, and disposed on the rear of the arm **630** are extensions **681** and **682**. The extensions **691** and **692** extend up and out of the plane of the arm **620** in a direction perpendicular to the plane of the arm **620** and curve toward one another in a plane parallel to the plane of the arm **620**. The extensions **681** and **682** extend up and out of the plane of the arm **630** in a direction perpendicular to the plane of the arm **630** and curve toward one another in a plane parallel to the plane of the arm **630**. The extensions **691** and **692** form a strap retainer **690**, and the extensions **681** and **682** form a strap retainer **680**. The strap retainer **690** has a C-shape having an opening **671** for receiving a portion of a strap, and the strap retainer **680** has a C-shape having an opening **661** for receiving another portion of the same strap or another strap. The strap is inserted into the C-shaped strap retainer **680** and **690** by orienting the strap in a plane that is perpendicular to the plane in which the arms **620** and **630** are disposed and perpendicular to the longitudinal axis of the receiving portion **600**. The location of the strap retainer **680**, **690** on the rear of the respective arms **630**, **620** facilitates securing the receiving portion **600** to a strap of a bag and subsequent attachment of the protrusion portion **490** to the receiving portion **600**.

In an exemplary embodiment the spring extensions **626**, **636** are thin members sized to be flexible. The arms **620**, **630** may be formed from a flexible plastic to provide for the

flexibility of the spring extensions **626**, **636**. Any known flexible plastic, such as nylon, polypropylene, etc., may be used for the arms **620**, **630**. Alternatively, the arms **620**, **630** may be formed from a metal, such as aluminum, spring steel, etc. It is also contemplated that the arms **620**, **630** may be formed from other materials other than plastics or metals. Such other materials may include carbon fibers, Kevlar® weaves, etc.

Referring now to FIGS. **22-24**, there is illustrated an exemplary alternative embodiment of the receiving portion **600**, which exemplary alternative embodiment is generally designated as **600'**, in accordance with an exemplary embodiment of the present invention. The receiving portion **600'** is generally similar to the receiving portion **600** but differs in several aspects. The receiving portion **600'** comprises an arm **620'** and an arm **630'** and further comprises a locking component **2300**. The arms **620'** and **630'** are generally similar to the arms **620** and **630** but further comprise respective slots **629'** and **639'**.

The locking component **2300** comprises a first pin **2310**, a second pin **2320**, and a bridge or cross-support member **2330** connecting the midpoint of the first pin **2310** with the midpoint of the second pin **2320**. In an exemplary embodiment, the second pin **2320** is longer than the first pin **2310**, thereby giving the locking component **2300** an asymmetrical H shape.

A first end of the first pin **2310** is sized to be disposed within the slot **639'**, and a second end of the first pin **2310** is sized to be disposed within the slot **629'**. The first and second ends of the pin **2310** are sized to be slidably translatable in the respective slots **639'**, **629'**.

The arm **620'** further comprises a slot **2420**, and the arm **630'** further comprises a slot **2430**. A first end of the second pin **2320** is sized to be disposed within the slot **2430**, and a second end of the second pin **2620** is sized to be disposed within the slot **2420**. The slots **629'**, **639'**, **2420**, **2430** and the locking component **2300** comprise a locking mechanism.

The locking mechanism is locked when the pin **2320** is disposed within the slots **2420**, **2430**. When the locking mechanism is locked, the locking component **2300** prevents the arms **620'**, **630'** from pivoting because the second pin **2320** is disposed within the slots **2420**, **2430**. The locking component **2300** thereby prevents the cavity **640** from opening and, therefore, prevents the protrusion **429**, if disposed within the cavity **640**, from being removed.

The locking mechanism is not locked when the pin **2320** is not disposed within the slots **2420**, **2430**. When locked, the locking mechanism is unlocked by a user grasping the pin **2320** and pulling it in a direction away from the cavity **640** to remove the pin **2320** from the slots **2420**, **2430**. The arms **620'**, **630'** may then be compressed to open the cavity **640** to insert or remove the protrusion **496**. To lock, the arms **620'**, **630'** are released and the pin **2320** is pushed into the slots **2420**, **2430**.

FIG. **25** illustrates an exemplary embodiment of a portion of a bag **2500**, in accordance with an exemplary embodiment of the present invention. The bag **2500** comprises at least one strap on which the receiving portions **400** and **600** are secured.

These and other advantages of the present invention will be apparent to those skilled in the art from the foregoing specification. Accordingly, it is to be recognized by those skilled in the art that changes or modifications may be made to the above-described embodiments without departing from the broad inventive concepts of the invention. It is to be understood that this invention is not limited to the particular embodiments described herein, but is intended to include all changes and modifications that are within the scope and spirit of the invention.

What is claimed is:

1. A clasp comprising:

a protrusion portion comprising a protrusion;

a receiving portion comprising a body having a central portion, a first side portion and a second side portion, said receiving portion further having a first arm, and a second arm, the first and second arms defining a receiving cavity configured to receive the protrusion of the protrusion portion, the first arm connected to the first side portions of the body by a plurality of first flexible connectors and the second arm connected to the second side portions of the body by a plurality of second flexible connectors,

wherein the protrusion is removably received in the cavity to engage the protrusion portion with the receiving portion.

2. The clasp of claim **1**, wherein each of the first arm and the second arm include a furthest extent from the central portion, wherein a width of the cavity has a first value when the first arm and the second arm are in a rest position, the width being adjustable to a second value when an inward compression force is applied to the furthest extent of the first arm and the furthest extent of the second arm such that a distance between the furthest extents of the first arm and the second arm is decreased, and wherein the second value is greater than the first value.

3. The clasp of claim **2**, wherein the protrusion includes a major protrusion diameter and a minor protrusion diameter, and wherein the second value of the width of the cavity is greater than the major diameter of the protrusion so as to allow the protrusion to be placed into and to be released from the cavity via the compression force applied to the first arm and the second arm.

4. The clasp of claim **1**, wherein the receiving portion includes at least one strap slot configured to secure the receiving portion to at least one strap.

5. The clasp of claim **1**, wherein:

the first arm comprises an inner surface, and outer surface, and a spring extension, and

the second arm comprises an inner surface, and outer surface, and a spring extension.

6. The clasp of claim **5**, wherein the spring extension of the first arm is positioned to compress against the outer surface of the second arm and the spring extension of the second arm is positioned to compress against the outer surface of the first arm when a compression is applied to the first and second arms, thereby resisting opening of the cavity of the receiving portion.

7. A clasp comprising:

a protrusion portion comprising a protrusion;

a receiving portion comprising a spring assembly having at least one spring, a first arm, and a second arm, the first and second arms defining a receiving cavity configured to receive the protrusion of the protrusion portion, the first arm and the second arm biased toward one another by the at least one spring to resist opening of the cavity,

wherein the protrusion is removably received in the cavity to engage the protrusion portion with the receiving portion.

8. The clasp of claim **7**, wherein each of the first arm and the second arm include a furthest extent, wherein a width of the cavity has a first value when the first arm and the second arm are in a rest position, the width being adjustable to a

second value when an inwardly compression force is applied to the furthest extent of the first arm and the second arm such that a distance between the furthest extents of the first arm and the furthest extent of the second arm is decreased, and wherein the second value is greater than the first value.

9. The clasp of claim **8**, wherein the protrusion includes a major protrusion diameter and a minor protrusion diameter, and wherein the second value of the width of the cavity is greater than the major diameter of the protrusion so as to allow the protrusion to be placed into and to be released from the cavity via the compression force applied to the first arm and the second arm.

10. The clasp of claim **7**, wherein the receiving portion includes at least one strap slot configured to secure the receiving portion to at least one strap.

11. The clasp of claim **7**, wherein:

the first arm comprises an extension, and

the second arm comprises an extension,

wherein the spring assembly is disposed between the extension of the first arm and the extension of the second arm.

12. The clasp of claim **11**, wherein the spring assembly comprises a first spring and a second spring, the first spring disposed between the extension of the first arm and an outer surface of the first arm, the second spring disposed between the extension of the second arm and an outer surface of the second arm,

wherein the first spring resists movement of the first arm toward a first end of the spring assembly, and wherein the second spring resists movement of the second arm toward a second end of the spring assembly, thereby resisting opening of the cavity of the receiving portion.

13. The clasp of claim **7**, further comprising a clip securing the first and second arm together.

14. A clasp comprising:

a protrusion portion comprising a protrusion;

a receiving portion comprising a body, a first rigid arm having a first proximal end and a first distal end, a second rigid arm having a second proximal end and a second distal end, and a flexible spring clamp, the first and second arms defining a receiving cavity configured to receive the protrusion of the protrusion portion, the spring clamp coupled to the first proximal end and the second proximal end to flexibly secure the first arm to the second arm,

wherein the protrusion is removably received in the cavity to engage the protrusion portion with the receiving portion.

15. The clasp of claim **14**, wherein each of the first arm and the second arm include a furthest extent at the first distal end and second distal end respectively, wherein a width of the cavity has a first value when the first arm and the second arm are in a rest position, the width being adjustable to a second value when an inward compression force is applied to the furthest extent of the first arm and the furthest extent of the second arm such that a distance between the furthest extents of the first arm and the second arm is decreased, and wherein the second value is greater than the first value.

16. The clasp of claim **15**, wherein the protrusion includes a major protrusion diameter and a minor protrusion diameter, and wherein the second value of the width of the cavity is greater than the major diameter of the protrusion so as to allow the protrusion to be placed into and to be released from the cavity via the compression force applied to the first arm and the second arm.

17. The clasp of claim **14**, wherein the receiving portion includes at least one strap slot configured to secure the receiving portion to at least one strap.

18. The clasp of claim **14**, wherein:

the first arm comprises an inner surface, an outer surface, and a spring extension, and

the second arm comprises an inner surface, an outer surface, and a spring extension.

19. The clasp of claim **18**, wherein the spring extension of the first arm is positioned to compress against the outer surface of the second arm and the spring extension of the second arm is positioned to compress against the outer surface of the first arm when a compression is applied to the first and second arms, thereby resisting opening of the cavity of the receiving portion.

20. The clasp of claim **14**, further comprising a locking component configured to releasably lock the first arm to the second arm to prevent the first arm from pivoting with respect to the second arm when the locking component is in a locking position.

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